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ABSTRACT

Described is the history of the United Nations Environment Programme (UNEP) since its formation in 1972. Also included is an examination of UNEP's major programs and projects, and an assessment of the organization's problems and future prospects. The function of UNEP is to coordinate the management and assessment of the world's environment by United Nations organizations and member nations. To illustrate how UNEP operates and to characterize the difficulties facing UNEP, this report highlights four program areas: Oceans, Arid Lands, the Global Environmental Monitoring System (GEMS), and Infoterra. Contributing to UNEP's past and future growth pains are: (1) the enormous scope of UNEP's mission, (2) external issues such as uncertain funding and political differences, and (3) internal management and operational concerns. An evaluation of the status of UNEP's 21 original goals concludes the report. (WB)

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NORMAN N. MILLER has been concerned with East Africa's anthropology and politics for more than two decades. In 1959-60 he traveled extensively in East and Central Africa and subsequently, with research support from the Ford Foundation, The National Science Foundation, and the Carnegie Foundation, lived in Tanzania, Kenya, and Uganda on nine separate occasions. He has taught at the University of Dar es Salaam and the University of Nairobi. Receiving the M.A. and Ph.D. degrees from Indiana University, in 1966 he joined the faculty of Michigan State University where he was founder and editor of *Rural Africana*, a research bulletin in the social sciences. He became an Associate Professor in 1969 and shortly thereafter he joined the Field Staff to report on East Africa. His publications include two edited volumes, *Research in Rural Africa* and *Faces of Change: Five Rural Societies in Transition*, chapters in several books, and articles in such publications as the *American Political Science Review*, the *Journal of Modern African Studies* and the *Canadian Journal of African Studies*. From 1971 to 1977 he was director of the AUFS Film Program and has produced or directed the 27 documentary films known collectively as the *Faces of Change*.

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by Norman N. Miller
[NNM-2-'79]

The United Nations Environment Programme

Part I: Evolution and Growth

It was once described as a part of the "quiet side" of the United Nations family, one of those organizations that did good works but rarely made headlines. Times have changed. Today the United Nations Environment Programme (UNEP), headquartered in Nairobi, Kenya, has come into prominence, not because of UN cliches about "spaceship earth," but because a great many ordinary people have come to realize they could be physically harmed by environmental hazards. The "common man" in industrial states has begun to worry about the environment in respect to his health and the health of his children. He is asking hard questions about contamination and industrial waste, about poisons and noxious gasses in the air he breathes.

The environmental hazards are different for the citizen of the developing world. Although he may not face the pollutants of the industrial age, he is a part of the two billion chronically ill and chronically poor that the World Health Organization has said are in desperate straits. His environment is a large part of the problem. It may consist of extreme overcrowding in an urban area, or overgrazing and misuse of the land in rural areas. Its capricious nature is very immediate; typhoons, floods, earthquakes, or drought are part of the natural condition. Improving the "quality of life" for these people means dealing with malaria, river blindness, debilitating parasitic diseases, recurring hunger, death in childhood or at best a life expectancy of 40 years.

It is a vain hope that the common man, either in the developed or the developing states, will be able to control his own destiny by controlling his environment in the foreseeable future. Behind this loss of control are certain environmental realities:

1. *Environment of Human Waste.* Man's historic struggle to deal with his own waste, particularly his own excreta, is a struggle that is currently being lost. Contamination of food and water in the poorer areas by such "fecal folly," plus contamination from garbage and industrial waste, leads to untold illnesses. The transmission of infectious diseases because of inadequate or antiquated sewage disposal ranks as the world's leading public health dilemma.

2. *Environment of Foul Water.* Coupled with poor sanitation is the world's other major environmental health problem: foul water. The vast majority of mankind has inadequate or inaccessible water supplies. The resulting health problems and dimensions of illness are so enormous that the UN has declared the decade of the 1980s "the decade of clean water."

3. *Environment of Poverty.* Poor, hungry people, often by necessity, misuse the environment. For those in need there is little regard for long-term consequences of environmental exploitation. That the poor cannot destroy the environment on the scale of the bulldozer-equipped industrial states is probably true, but over time the cumulative effect can be just as devastating. Much of UNEP's work underscores the fact that "poverty is the worst form of pollution."

4. *Environment of the Privileged.* The coastal bastions of the rich, the architecturally inappropriate high-rise habitats, the rapid, unplanned development of industrial structures, the "pro-

tected" areas and "environments for sale" are the other side of the Environment of Poverty problem. Excessive overbuilding in some areas and exploitation of the land is a common dilemma. Even where building codes and environmental protection laws exist, developers often find ways to bypass them.

5. *Environment of Entangled Laws.* Facing any environmentally concerned citizen are a number of legal, regulatory, and bureaucratic constraints that prevent corrective action even if he has accurate environmental information and a just case. Laws in most countries protect the status quo and the vested interest groups. The failures of the concerted action groups far outweigh their successes.

6. *Environmental Nonmanagement.* Many areas which are virtually uninhabited have no government or agency that takes responsibility for environmental management. Parts of the open sea, many deserts, polar areas, and air spaces can be exploited and contaminated without regulation or penalty. The paradox here is that many sparsely settled regions are marginal areas that are particularly vulnerable to human impact.

7. *Environment or Development.* Environmental disruption occurs with every developmental project, be it a road, a dam, a new building, or an airport expansion. Hidden consequences and occasionally unplanned disasters are the price of such development. Rising human costs accompany development projects that are well-intentioned but not ecologically well planned. Called the "disease and development" phenomena, the incidence of certain diseases may increase owing to unplanned consequences of development projects, such as when malaria levels rise dramatically because of the new lake waters behind a hydroelectric dam, or when widespread schistosomiasis occurs after an irrigation scheme is in place.

8. *The Environmental Unknown.* There are legitimate fears of what the future will hold. Scientists are unable to predict with any certainty what many of the 20,000 manmade chemicals in our environment will do. This inability to predict could lead to man's being overtaken and run down by environmental occurrences totally beyond his control. Perhaps most frightening is the ozone problem. Ultraviolet rays are affecting the microorganisms of the lower food chain which already live on the edge of their radiation tolerance. The problem is serious and compelling; it is tantamount to contamination of the human food chain. A similar problem concerns the increase in CO^2 levels in our atmosphere due, among other things, to the burning of fossil fuels and the large-scale loss of forests. If present trends continue, the CO^2 levels will have doubled by the year 2030. This situation could profoundly change the moisture content of the atmosphere and make deserts of, among other places, the United States corn belt.

* * * * *

These many facets of our environmental problem make the establishment of an agency like UNEP, which attempts to be the environmental conscience of the United Nations, a momentous undertaking. Unfortunately, for many ordinary citizens, these efforts may be too little and too late.

UNEP's Turbulent Background

UNEP was born in Stockholm in 1972 when the United Nations convened the First World Conference on the Human Environment. Some 113 nations sent delegations to work with over 500 representatives of concerned organizations. Together they drew up recommendations and action plans for the UN, and, six months later, in December 1972, the UN General Assembly moved formally to establish UNEP.

That the UN acted so quickly was amazing; but even more amazing was the establishment of UNEP headquarters in Nairobi, Kenya, the first headquarters of a UN body to be placed in a developing country. Maurice Strong, the enthusiastic Canadian behind the planning of the Stockholm Conference, became the first Executive Director.

UNEP's first years were difficult by any measure. Being the "new boy" in the UN family meant institutional bridges had to be built, areas of responsibility settled, and priorities determined. The euphoria of Stockholm soon gave way to the sober realization that most of the world's environmental problems were far more complex than generally perceived. In fact, environmental issues often defied scientific understanding, or were so entwined in political intrigues and vested national interests that titanic efforts would be needed to improve them. Not even the basics for a concerted

international effort were in place; calibration and measurement systems around the world varied widely and rarely produced the same results on the same problems. Information flow on environmental data was episodic or nonexistent, and worldwide monitoring of environmental factors such as air, soil, water, or pollutants was in its infancy.

It took four years for the fledgling organization to begin to have an impact. Then, just as momentum and a few successes were beginning to develop, UNEP entered a year that has been called "turbulent '76." First, Maurice Strong resigned and was replaced by his deputy, Mostafa Tolba. Second, UNEP had a major organizational hand in Habitat, the biggest, most expensive, and most intricately prepared of the UN World Conferences. Delegates from 132 nations met in Vancouver, Canada, to focus on the worldwide problems of human settlement. Even today, nearly four years later, no one is quite certain of the full implications of Habitat. Critics suggest it was largely a political debate carried out "for the people back home," with the intention not only of raising political consciousness about environmental issues, but also of tweaking the noses of the richer nations for a variety of environmental misdeeds. Some of the debates were acrimonious, and occasionally bizarre.

On the positive side, the environmental conscience of millions of people was undoubtedly heightened, a strong push for governmental and intergovernmental priorities concerning clean water emerged, and the reality that environment can be as political an issue as anything else was underscored. Also, constructively, information on many levels was exchanged and many film presentations organized by UNEP and the national delegations were acclaimed as exceptional. Along with the issues debated, these materials undoubtedly helped to plant educational seeds. Overall, despite the upheavals, Habitat marked the beginning of a global search for the solutions to the larger problems of human settlement.

If the year of Habitat is considered UNEP's most difficult period, it must also be seen as one of major growth. By the end of 1976 UNEP had other accomplishments. The first of a series of small desertification study conferences went well, and seminars in Europe and Africa concentrated on such topics as motor vehicle pollution, marine pollution, regional monitoring, and water development. At the December 1976 UNESCO meeting in Nairobi, the first ever in Africa, Tolba was able to point with some pride to the fact that UNEP was giving cohesion to numerous environmental activities in the UN system, its main reason for being established some four years earlier. The positive momentum was maintained throughout 1977 when UNEP managed to organize another world conference, on desertification. This time the political polemics associated with Habitat were avoided and the meetings were a success.

Evidence that the organization had finally come of age and gained an important place as an international agency came at the fifth governing council in May 1977 and again at the UN General Assembly meeting in January 1978. The United States, an important contributor of funds, had high praise for UNEP; the General Assembly went further, encouraging all governments to contribute generously to UNEP and to aid in the speedy implementation of the action plans that had come out of the Desertification Conference.

If the public acceptance battles had been won, which is remarkable in itself, UNEP's battle to rationalize the environmental activities within the UN and between nations was just beginning. The first priority was to evolve a number of innovative "tactical" weapons to bring the various organization elements together. One of Strong's early contributions, which has worked well, was to co-opt member states into the planning processes and thereby insure their acceptance and cooperation when the policy was implemented. "The planning process is the policy," said Strong. The words and the technique became a hallmark of Strong's free-wheeling, gently manipulative style. By contrast, Mostafa Tolba's tenure has been characterized by more systematic, scientific style, with emphasis on administrative detail. Each of UNEP's Executive Directors has left a distinctive mark on the organization.

Evolution of the UNEP Approach

How UNEP developed its more substantive activities is something of a saga. Because "environment" encompasses nearly every sector of human endeavor, there arose from the beginning the necessity to define and limit the organization's activity. Environmental concerns cut across a vast

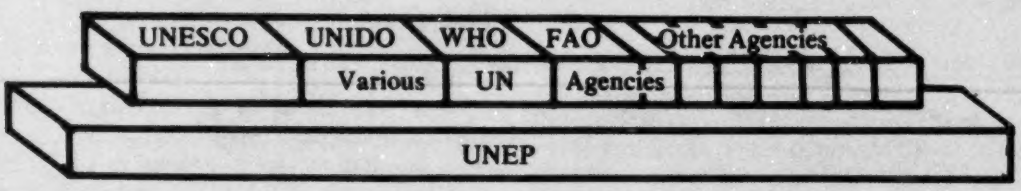
Mostafa Tolba, UNEP's current Executive Director, is an Egyptian microbiologist who had been Deputy Executive Director of UNEP since its inception. A former President of the Egyptian Academy of Scientific Research and Technology, he both headed his country's delegation to the UN Conference on Human Environment in 1972 and served as Vice President of the conference. He was educated at Cairo University and received his Ph.D. from the University of London. He has served in several UN agencies and held a number of senior and ministerial posts in the Egyptian government.

Maurice Strong was named Secretary-General of the United Nations Conference on the Human Environment in September 1970, and served as the agency's Executive Director until the end of 1975. He then returned to the service of the Canadian government where he is President and Chairman of Petro-Canada. He was the first recipient of the International Pahlavi Environment Prize, awarded by the UN for his work with UNEP.

array of organizations. How did the UNEP architects proceed and what were some of their assumptions? Put simply, the evolution occurred in several stages.

First, major activity "sectors" were established: Health, Agriculture, Education, Industry, and others. UNEP's first charge was to work across these sectors, to serve as an environmental coordination body within the UN family. Thus each sector involved UNEP with other UN agencies: Health with WHO, Agriculture with FAO, Industry with UNIDO, Education with UNESCO and so forth (Figure 1). Even within the UN family it was to be a difficult, delicate task in coordination, liaison, communications, and administration. At the very least the approach was a diplomatic challenge.

Figure 1
UNEP Activities Cut Across Established Functions



General view of the temporary headquarters of the United Nations Environment Programme, Nairobi, Kenya.

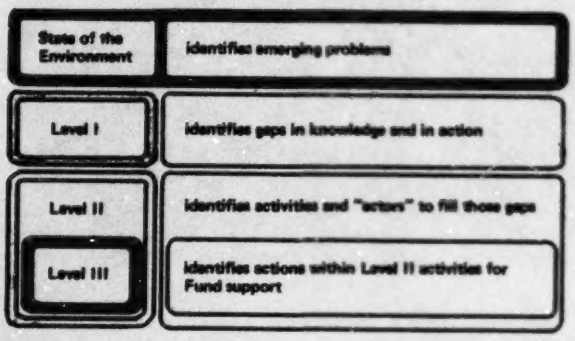
Second, functional activities evolved into two main areas: Environmental Assessment and Environmental Management. Undergirding both these functions were the supporting measures necessary to carry them out. These measures included education, training, information, and technical assistance.[2]

Third, after the general sectors of work and the functional activities were in place, priority subject areas were debated and three were selected: (1) The Global Environmental Monitoring System (GEMS); (2) Infoterra, an international referral system; and (3) The International Register of Potentially Toxic Chemicals (IRPTC). Together these activities comprise Earthwatch.

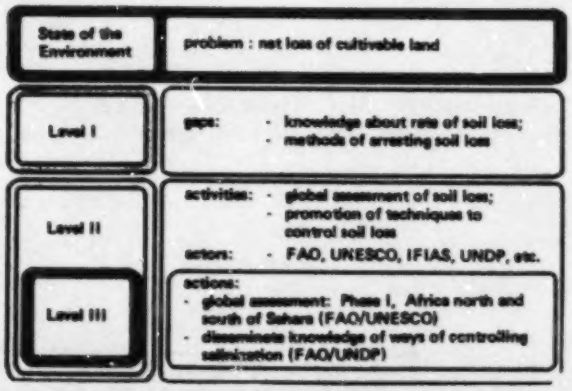
Under Environmental Management six priority subject areas were established: (1) Oceans; (2) Terrestrial Ecosystems; (3) Energy; (4) Natural Disasters; (5) Environment and Development; and (6) Human Settlements and Human Health.

Some of the priority areas have changed over time, some gaining greater importance, as in the case of Oceans and of Deserts within the Terrestrial Ecosystems area, others receiving the same support or "hiving off," as in the establishment of a new Habitat and Human Settlements Organization which is now separate from UNEP.[3]

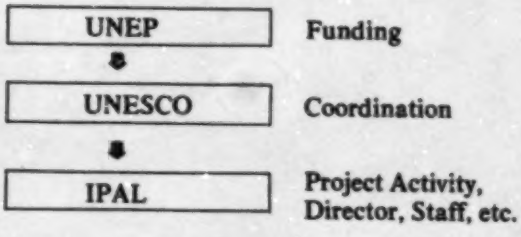
The fourth stage was comprised of defining the "right activities" for each subject area, what UNEP called the "programmatic process." It is essentially an analytical system that first identifies the problem within the environmental arena, then breaks it down on three levels:


State of the Environment
identifies emerging problems
Level I
identifies gaps in knowledge and in action
Level II
identifies activities and "actors" to fill those gaps
Level III
identifies actions within Level II activities for Fund support

An example of how the analytical process would proceed is seen in the problem of worldwide loss of soil.


State of the Environment
problem : net loss of cultivable land
Level I
gaps:
- knowledge about rate of soil loss;
- methods of arresting soil loss
Level II
activities:
- global assessment of soil loss;
- promotion of techniques to control soil loss
actors:
- FAO, UNESCO, IFIAS, UNDP, etc.
Level III
actions:
- global assessment: Phase I, Africa north and south of Sahara (FAO/UNESCO)
- disseminate knowledge of ways of controlling salinization (FAO/UNDP)

In operational terms the "programmatic process" is made up of several hundred projects, mainly conducted outside UNEP by other agencies or independent consultants. Typically, UNEP creates and funds the project with one or more cooperating agencies, and has some intellectual input into its planning and monitoring, but essentially leaves the operation of the project to the UN agency most directly concerned. A desertification project in northern Kenya, entitled Integrated Project in Arid Lands (IPAL), is a typical example:



UNEP does carry out some substantive project activities directly, particularly in the areas of information, education, conference organization, and publishing.

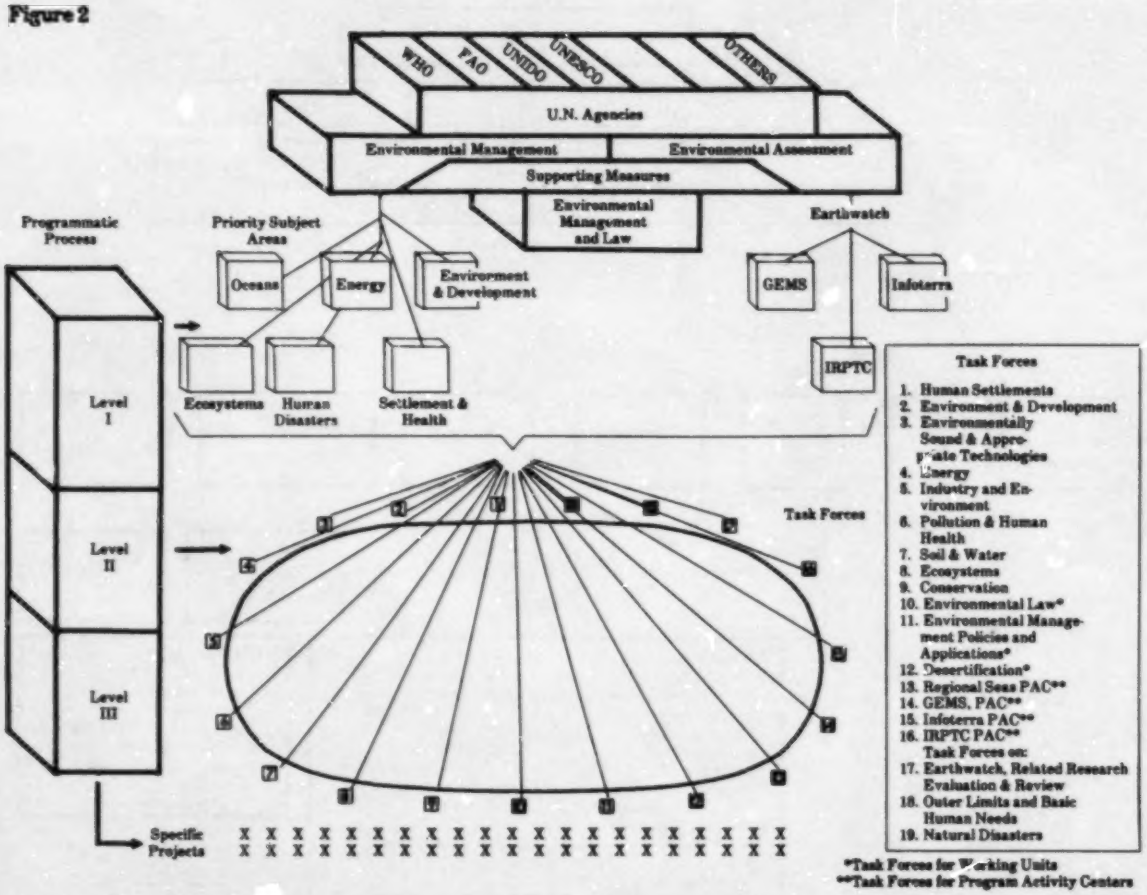
Up to this point there has been a logical evolution from the sectoral breakdown of environmental problems by the UN organization directly concerned to the establishment of the functional activities of environmental assessment, manage-

ment, and support measures. It was also logical to establish priority subject areas under these general activities, and to evolve the "programmatic process" as a tool to get things done. On paper these four steps look workable; in reality a whole range of human, behavioral, and philosophical differences have compounded the overall management problem. To counter some of these UNEP has derived another tool: the task force.

Specialized task forces at a lower, more specific operational level are designed to integrate various activities around specific tasks. Each task force, for example, has an information officer assigned and may include other UNEP staff. Task Forces are formed on three bases: first as *ad hoc* groups, second as task forces based on one of the units, and finally as a part of the Program Activity Centers. Their function is to monitor existing projects in their areas, and to review and coordinate new projects. The task forces, 19 in early 1979, attach themselves to the evolutionary chart at different points, like scattered buttons on the organizational vest. Although the task forces came as an innovation, after the programmatic process was established, they are a part of that process and are integrated into the overall UNEP system above the specific project level.

Simple diagrams do not do justice to the relationship between the stages, but seen in combination, the five stages do give an overview of UNEP's evolution (Figure 2). Seen in context

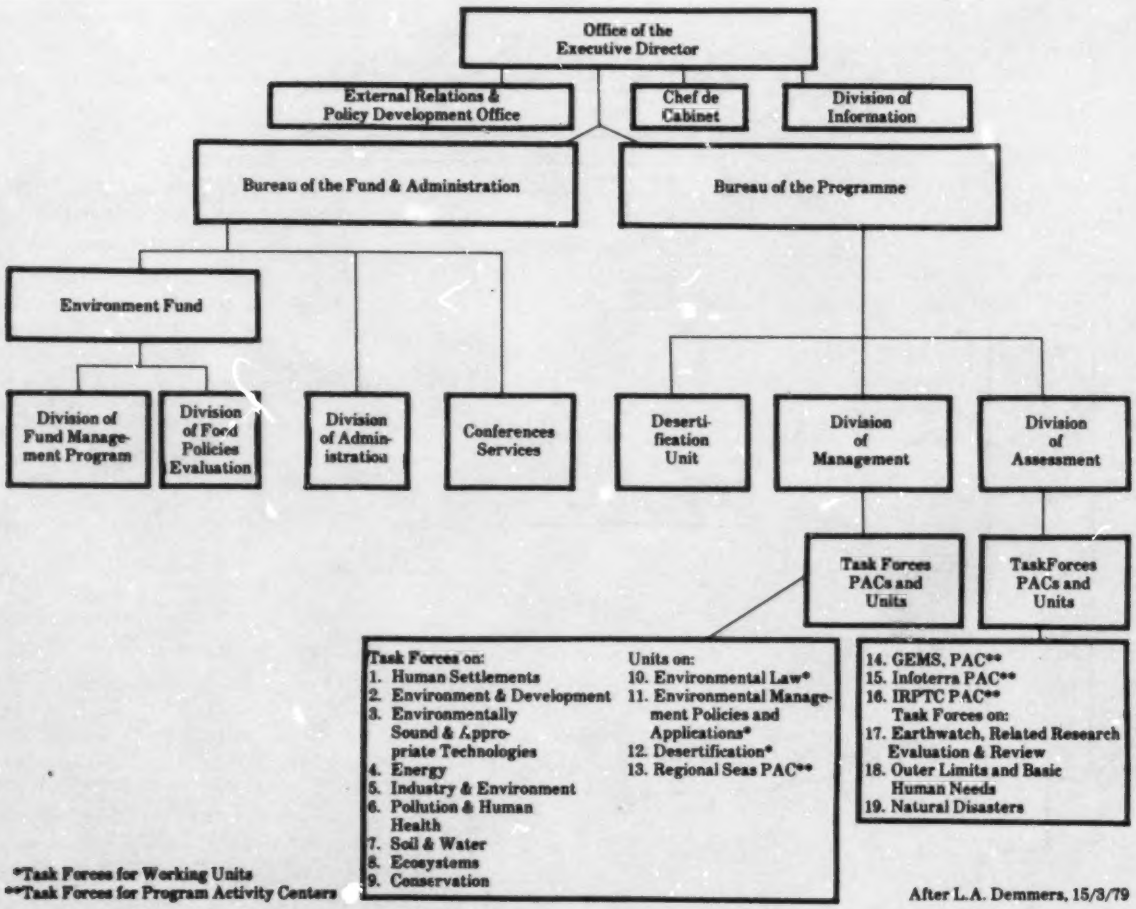
Figure 2



with the overall UNEP organization, a simplified version of the agencies' organization is depicted in Figure 3.

Overall, the first eight years of UNEP must be seen as only a beginning. The agency is orchestrating some of the first concrete steps in a worldwide process. The late Margaret Mead called it a rising environmental consciousness... "a revolution in thought fully comparable to the Copernican revolution by which, four centuries ago, men were compelled to revise their whole sense of the Earth's place in the cosmos. Today we are challenged to recognize as great a change in our concept of man's place in the biosphere."

Figure 3



*Task Forces for Working Units
**Task Forces for Program Activity Centers

After L.A. Demmers, 15/3/79

Part II: Programs and Projects

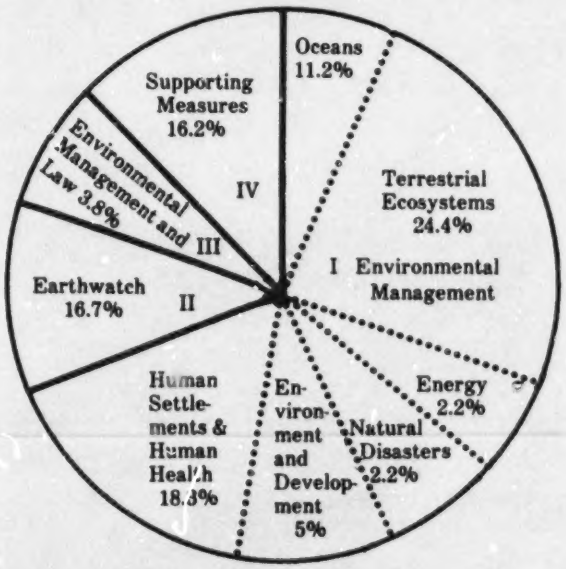
As the Kenya-based United Nations Environment Programme approaches its eighth birthday, it is fair to ask a few key questions. What has UNEP achieved? Where is it going? What programs show promise? In fact, the organization is such a diverse collection of activities, an in depth description would be a saga in itself. Each program has a unique case history and a unique set of problems. Given the polyglot nature of UNEP, an overview of its work is perhaps most easily seen through the established funding categories. Essentially, UNEP allocates its program resources in nine areas, grouped under four sectors (Figures 4 and 5).[4]

Figure 4
UNEP Program Resources
1978-1979 US$

I. Environmental Management (Subject-matter Programs)	
1. Oceans	7,446,660
2. Terrestrial Ecosystems	16,083,140
a. arid and semiarid lands	
b. tropical woodlands	
c. mountain, island, coastal and other ecosystems	
d. soils	
e. water	
f. genetic resources	
g. wildlife, protected areas	
3. Energy	1,436,040
4. Natural Disasters	1,320,960
5. Environment and Environment	3,274,990
6. Human Settlements and Human Health	12,074,950
II. Environmental Assessment (Earthwatch)	11,021,200
III. Environmental Management (including Environmental Law	2,534,970
IV. Supporting Measures	10,803,975
Total (Two Years)	65,996,885

Source: "Contributions to the Chapter on the Environment of the U.N. Medium Term Plan for 1980-1983," May 11, 1978, Doc. 2.

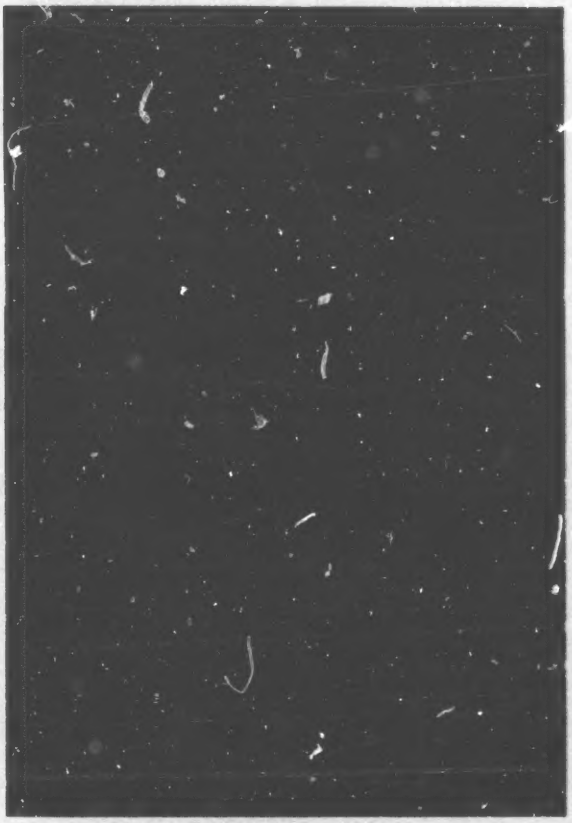
Figure 5
Resource Allocations for 1978-1983



Overview of the Programs

UNEP's four major subdivisions are not at all balanced in terms of resources administered. The Environmental Management Sector commands a lion's share of 63.3 percent of the budget; the tiny Environment Management and Law sector some 3.8 percent. The substantive concerns in each sector reveal a wide range of activity.

Sector I. In the Environmental Management sector, the Oceans program, which is led by Regional Seas activities, is one of the earliest UNEP endeavors. The Terrestrial Ecosystems programs include major efforts in the arid lands desertification program, plus programs in water, tropical woodlands, mountain and coastal ecosystems, soils, genetic resources, and wildlife. Energy and Natural Disasters are small, independent, stimulus programs that attempt to draw attention to important issues in their areas of concern. The Environment and Development program is concerned with the relationship between the state of the environment and pressures of modern development. The Human Settlements and Human Health program, commanding 18 percent of the budget, is somewhat in flux due to the recent establishment of a



In the World Environment Photo Contest in 1974, this landscape by Tadeusz Budzinski (Poland), called "ocalmy ziemie," presents the environmental challenge in the starkest terms.

separate Habitat agency concerned exclusively with settlement.

Sector II. The Environmental Assessment (Earthwatch) is made up of the subprograms mentioned in Part I: GEMS, Infoterra, IRPTC, and small programs in data processing. Collectively these activities have 16.7 percent of the UNEP program budget.

Sector III. The Environmental Management and Law unit carries out research activities in the managerial, legal, and diplomatic sectors. The work includes establishing mechanisms for translating research results into legal and procedural advice, and the application of systems analysis to environmental management questions. Some of the specific activities include: maintaining a register of environmental agreements, conventions, and protocols, giving full texts of each; providing reminders to governments to adhere to the conventions on such matters as marine pollution; identifying difficulties some governments have in becoming party to such conventions and trying to assist in overcoming them; and keeping developments such as the Law of the Sea Conference under review and helping prepare legal guidelines. The unit is also carrying out a survey to determine to what extent universities around the world teach environmental law. Teaching materials are being developed to promote such courses.

Sector IV. The Supporting Measures that underlie Assessment and Management programs include an information division which carries out writing and press relations for UNEP, a publications program, and the production of films, sound tapes, and other audio-visual materials. The information division also includes the coordination of World Environment Day and a program of regional information "leverage centers" around the world. Other supporting programs include environmental education, environmental training, and technical assistance. In addition there is an external relations office, a library and a registry, and follow-up office.

Four Key Programs

Four program areas have been selected to illustrate both how UNEP programs operate, and how difficult it is for any agency to rationalize environment issues: two programs in the Environmental Management sector, Oceans and Arid Lands, and two in Environmental Assessment, GEMS and Infoterra.[5] Each case illustrates a different type of problem and gives us a lesson in the international environmental bureaucracy.

Oceans

As U.S. Secretary of State in 1976, Henry Kissinger declared: "The Oceans are not merely the repository of wealth and promise; they are, as well, the last completely untamed frontier of our planet. As such, their potential—for achievement or for strife—is vast." The objective of the UNEP Oceans program is to coordinate and catalyze both national and international organizations in order to safeguard the life-supporting systems in the oceans. The central problem is contamination, particularly in enclosed ocean areas. With intensification of man's activities on land and in

coastal areas, pollution has accelerated, especially in offshore areas. In addition, there are global problems affecting all ocean areas from the spread of airborne matter to the oil film covering the seas. The situation threatens marine life, the health of the oceans, and human health in many parts of the world.

A part of the solution lies in control of the sources of pollution, which is a difficult, complicated task. It can be achieved effectively only by measures which include not only the assessment of the present pollutants and their effects on human and marine life, but also the management of human activities and marine processes to achieve a sustainable balance between man and the sea.

The Regional Seas Program is the oldest and most successful of UNEP Ocean activities. It initially concentrated on the Mediterranean, and particularly on pollution problems. Since 1975 the program has expanded to become concerned with eight ocean regions (see Map I), not only in terms of pollution, but including the management of marine resources, aquaculture, the creation of marine parks, and the architectural development of tourist areas. Although the Regional Seas objectives are straightforward and understandable to a layman, as the accompanying description of MED-POL illustrates, the specific activities can plunge one immediately into head-spinning scientific complexities.

MED-POL

The most developed regional monitoring program thus far is known as the Mediterranean Pollution Monitoring and Research Programme (MED-POL). Eighty-three marine science institutions from sixteen Mediterranean countries and the European Economic Community participate in eight pilot projects. Initiated in 1975, the projects' monitoring is based on agreed sampling and analytical procedures with permanent intercalibration of the techniques used. This covers:

- Determination of levels of selected metals, particularly mercury and cadmium, in marine organisms
- Determination in marine organisms of selected organochlorine compounds such as DDT, PCBs, dieldrin and their metabolites
- Sanitary and health surveillance of selected coastal secretional and shellfish-growing waters
- Assessment of petroleum hydrocarbons pollution
- Monitoring of changes in marine communities and ecosystems that might be the result of ocean pollution.

Peter Thacher, UNEP Deputy Executive Director and the highest-ranking American in the agency, has a special interest in the Regional Seas program. He was vitally concerned with the Mediterranean even before he came to UNEP.

Thacher and his colleagues have assembled an impressive list of accomplishments, including the successful stimulation of international cooperative agreements to protect the Mediterranean from further pollution. Programs to concentrate on revitalization measures have been established

Peter Shaw Thacher was Director of UNEP's Geneva Office before becoming Deputy Executive Director of UNEP. He attended Dartmouth College and Yale University, from which he graduated in 1948 after graduate work in architecture and city planning. His association with UNEP began in 1971 when he was involved in preparations for the Stockholm Conference and served as the Secretariat Program Director. Prior to this he was a U.S.Foreign Service officer, with postings in Europe, the Far East and as Counselor for Science, Technology and Environment with the U.S. Permanent Mission to the United Nations in New York.

in 83 laboratories in 16 Mediterranean countries. These programs study the sources of pollutants, levels, effects, and resulting problems. UNEP-sponsored intergovernmental meetings in Barcelona, Monaco, and elsewhere have resulted in treaties to control pollution both from ships and from land-based sources such as rivers that discharge industrial wastes. As Thacher notes, "It's one thing to gain agreement that dumping pollutants into the open sea is bad and harmful to everyone; it's another to help governments to reach 200 miles up a river to turn off a polluting faucet."

A further Mediterranean success is the creation of a regional center on Malta for combatting oil pollution. It consists of an operations room, switchboard, maps, and control center to assist in pinpointing oil spills and coordinating clean-up activities.

Marine pollution monitoring.

The actual process of gaining these agreements in such a highly charged political arena calls for a strong mixture of diplomacy, funds, technical information, and extensive consultation. How does it work?

Beginning in 1974, the Mediterranean has served as the testing area for programs that now are under way in six other regional seas. The main tool is the "action plan," which is done in four formal stages (Figure 6).

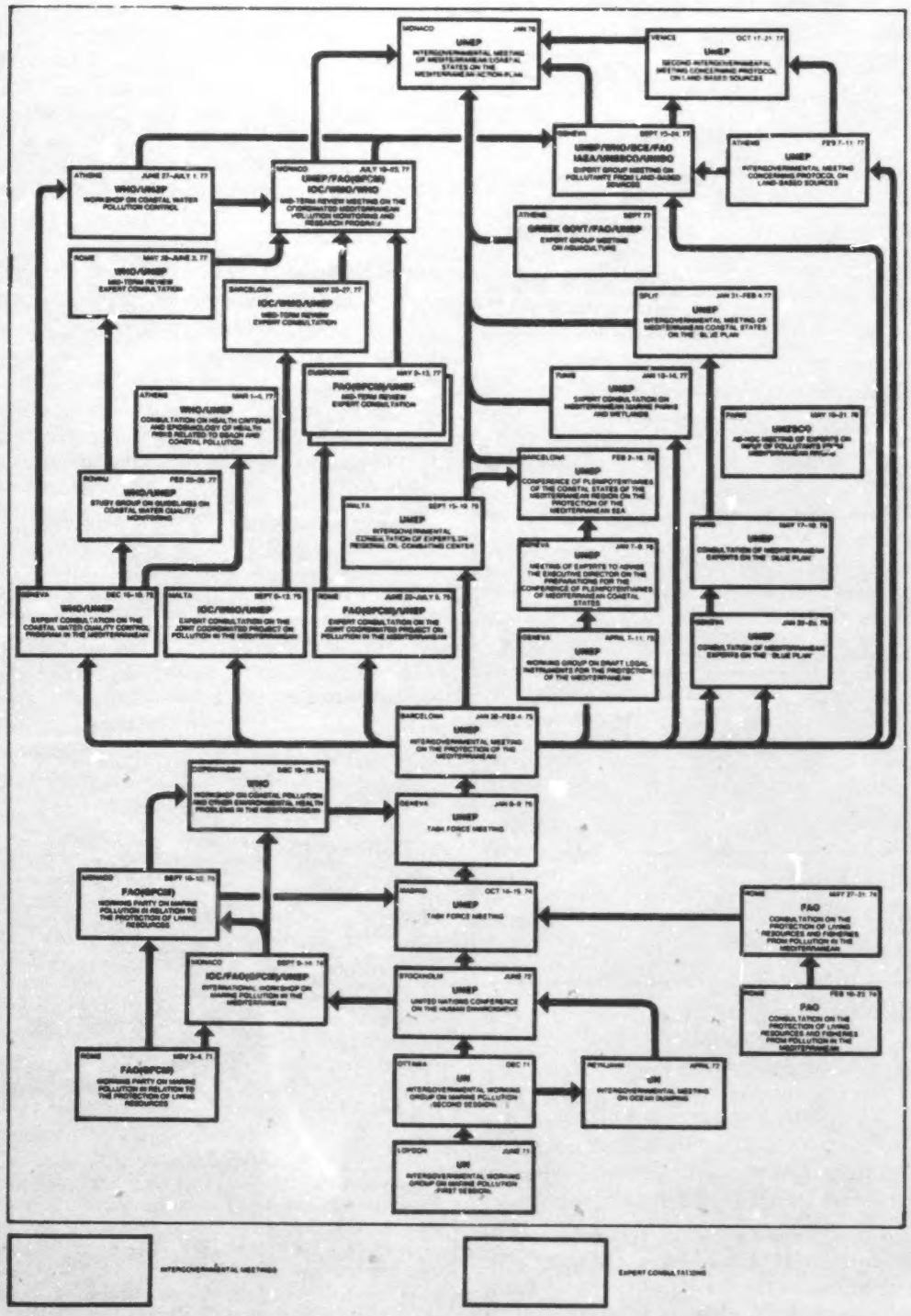
Figure 6

1. Formulation Stage	Extensive Consultation between UN Agencies and governments involved
2. Preparation of a Draft Action Plan	Review of present situation and past results Fact-finding mission Feasibility studies Review of National Legislation and national Workshops Expert group meetings
3. Adoption of Action Plan	International Conference
4. Implementation Phase Components	Environmental Assessment State of marine and coastal environment Trends in the environment Socioeconomic infrastructure Environmental Management Legal instruments Development guidelines Pollution control Protection of living resources Supporting Measures Education Training Information Technical assistance

The work that goes into actually attaining an action plan is staggering. The conferences, intergovernmental meetings, and expert consultations for the Mediterranean plan began in 1971. They finally led to agreements for an action plan in 1975. and culminated in the Geneva meetings of 1979. Here some 13 contracting parties plus the EEC approved a program and budget for succeeding years. Fifty percent of the costs are to be borne by Mediterranean governments through a trust fund which UNEP will administer on their behalf. Some 37 major sessions had been necessary, as Peter Thacher has described (Figure 7).

Several other regional seas programs have followed the Mediterranean model (Map 1). The Gulf of Kuwait program is farthest along but in each of six other areas programs are under way.

Figure 7 Chart showing meetings held in connection with the Mediterranean Action Plan.


MONACO JAN 76
UNEP
INTERGOVERNMENTAL MEETING OF MEDITERRANEAN COASTAL STATES ON THE MEDITERRANEAN ACTION PLAN
VENICE OCT 17-21 77
UNEP
SECOND INTERGOVERNMENTAL MEETING CONCERNING PROTOCOL ON LAND-BASED SOURCES
GENEVA SEPT 15-20, 77
UNEP/WHO/ICES/FAO IAEA/UNESCO/UNIDO
EXPERT GROUP MEETING ON POLLUTANTS FROM LAND-BASED SOURCES
ATHENS FEB 7-11 77
UNEP
INTERGOVERNMENTAL MEETING CONCERNING PROTOCOL ON LAND-BASED SOURCES
ATHENS JUNE 27-JULY 1 77
WHO/UNEP
WORKSHOP ON COASTAL WATER POLLUTION CONTROL
MONACO JULY 18-22, 77
UNEP/FAO(GFCM)
IOC/WMO/WHO
MID-TERM REVIEW MEETING ON THE OCEANOGRAPHIC POLLUTION MONITORING AND RESEARCH PROGRAM
ATHENS SEPT 77
GREEK GOVT./FAO/UNEP
EXPERT GROUP MEETING ON AQUACULTURE
ROME MAY 29-JUNE 3, 77
WHO/UNEP
MID-TERM REVIEW EXPERT CONSULTATION
BARCELONA MAY 23-27, 77
IOC/WMO/UNEP
MID-TERM REVIEW EXPERT CONSULTATION
SPLIT JAN 31-FEB 4 77
UNEP
INTERGOVERNMENTAL MEETING OF MEDITERRANEAN COASTAL STATES ON THE BLUE PLAN
COPENHAGEN MAY 9-13, 77
FAO(GFCM)/UNEP
MID-TERM REVIEW
EXPERT CONSULTATION
TUNIS JAN 10-14, 77
UNEP
EXPERT CONSULTATION ON MEDITERRANEAN MARINE PARKS AND WETLANDS
ATHENS MAR 1-5, 77
WHO/UNEP
CONSULTATION ON HEALTH CRITERIA AND EPIDEMIOLOGY OF HEALTH RISKS RELATED TO BEACH AND COASTAL POLLUTION
PARIS MAY 16-21, 78
UNESCO
AD-HOC MEETING OF EXPERTS ON INPUT OF POLLUTANTS FROM LAND-BASED SOURCES
ROME FEB 20-25, 77
WHO/UNEP
STUDY GROUP ON GUIDELINES ON COASTAL WATER QUALITY MONITORING
BARCELONA FEB 7-10, 78
UNEP
CONFERENCE OF PLENIPOTENTIARIES OF THE COASTAL STATES OF THE MEDITERRANEAN REGION ON THE PROTECTION OF THE MEDITERRANEAN SEA
MALTA SEPT 15-19, 78
UNEP
INTERGOVERNMENTAL CONSULTATION OF EXPERTS ON REGIONAL OIL COMBATTING CENTER
PARIS MAY 17-19, 78
UNEP
CONSULTATION OF MEDITERRANEAN EXPERTS ON THE 'BLUE PLAN'
GENEVA JAN 7-9, 78
UNEP
MEETING OF EXPERTS TO ADVISE THE EXECUTIVE DIRECTOR ON THE PREPARATIONS FOR THE CONFERENCE OF PLENIPOTENTIARIES OF MEDITERRANEAN COASTAL STATES
GENEVA JAN 29-30, 79
UNEP
CONSULTATION OF MEDITERRANEAN EXPERTS ON THE 'BLUE PLAN'
GENEVA DEC 10-19, 73
WHO/UNEP
EXPERT CONSULTATION ON THE COASTAL WATER QUALITY CONTROL PROGRAM IN THE MEDITERRANEAN
MALTA SEPT 6-13, 75
IOC/WMO/UNEP
EXPERT CONSULTATION ON THE JOINT COORDINATED PROJECT ON POLLUTION IN THE MEDITERRANEAN
ROME JUNE 30-JULY 5, 75
FAO(GFCM)/UNEP
EXPERT CONSULTATION ON THE JOINT COORDINATED PROJECT ON POLLUTION IN THE MEDITERRANEAN
GENEVA APRIL 7-11, 75
UNEP
WORKING GROUP ON DRAFT LEGAL INSTRUMENTS FOR THE PROTECTION OF THE MEDITERRANEAN
BARCELONA JAN 30-FEB 4, 75
UNEP
INTERGOVERNMENTAL MEETING ON THE PROTECTION OF THE MEDITERRANEAN
COPENHAGEN DEC 16-19, 74
WHO
WORKSHOP ON COASTAL POLLUTION AND OTHER ENVIRONMENTAL HEALTH PROBLEMS IN THE MEDITERRANEAN
GENEVA JAN 6-9, 75
UNEP
TASK FORCE MEETING
MONACO SEPT 16-18, 74
FAO(GFCM)
WORKING PARTY ON MARINE POLLUTION IN RELATION TO THE PROTECTION OF LIVING RESOURCES
MADRID OCT 14-19, 74
UNEP
TASK FORCE MEETING
ROME MAY 27-31, 74
FAO
CONSULTATION ON THE PROTECTION OF LIVING RESOURCES AND FISHERIES FROM POLLUTION IN THE MEDITERRANEAN
MONACO SEPT 9-14, 74
IOC/FAO(GFCM)/UNEP
INTERNATIONAL WORKSHOP ON MARINE POLLUTION IN THE MEDITERRANEAN
STOCKHOLM JUNE 72
UNEP
UNITED NATIONS CONFERENCE ON THE HUMAN ENVIRONMENT
ROME FEB 16-22, 74
FAO
CONSULTATION ON THE PROTECTION OF LIVING RESOURCES AND FISHERIES FROM POLLUTION IN THE MEDITERRANEAN
ROME NOV 3-4, 71
FAO(GFCM)
WORKING PARTY ON MARINE POLLUTION IN RELATION TO THE PROTECTION OF LIVING RESOURCES
OTTAWA DEC 71
UN
INTERGOVERNMENTAL WORKING GROUP ON MARINE POLLUTION SECOND SESSION
REYKJAVIK APRIL 72
UN
INTERGOVERNMENTAL MEETING ON OCEAN DUMPING
LONDON JUNE 71
UN
INTERGOVERNMENTAL WORKING GROUP ON MARINE POLLUTION FIRST SESSION
INTERGOVERNMENTAL MEETINGS
EXPERT CONSULTATIONS

Source: Peter S. Thacher, "*The Mediterranean Action Plan*," *Ambio*, Vol. 6, No. 6, 1977, p. 308.

Status of Regional Seas Programs (1979)			
Regional Seas	Draft Action Plan	Adoption of Action Plan	Implementation
Mediterranean	1974	1975	Blue Plan Malta Oil Spill Center Priority Action Programs
Gulf of Kuwait	1976	1978	Research and monitoring projects Blue Plan Priority Action Programs
Gulf of Guinea	1977	expected 1979	"
Caribbean	1977	expected 1980	"
Red Sea	1975	1976	Training and Research Centers
East Asian Seas	1977	–	–
South Pacific Selected Areas	Planning Stage	–	–

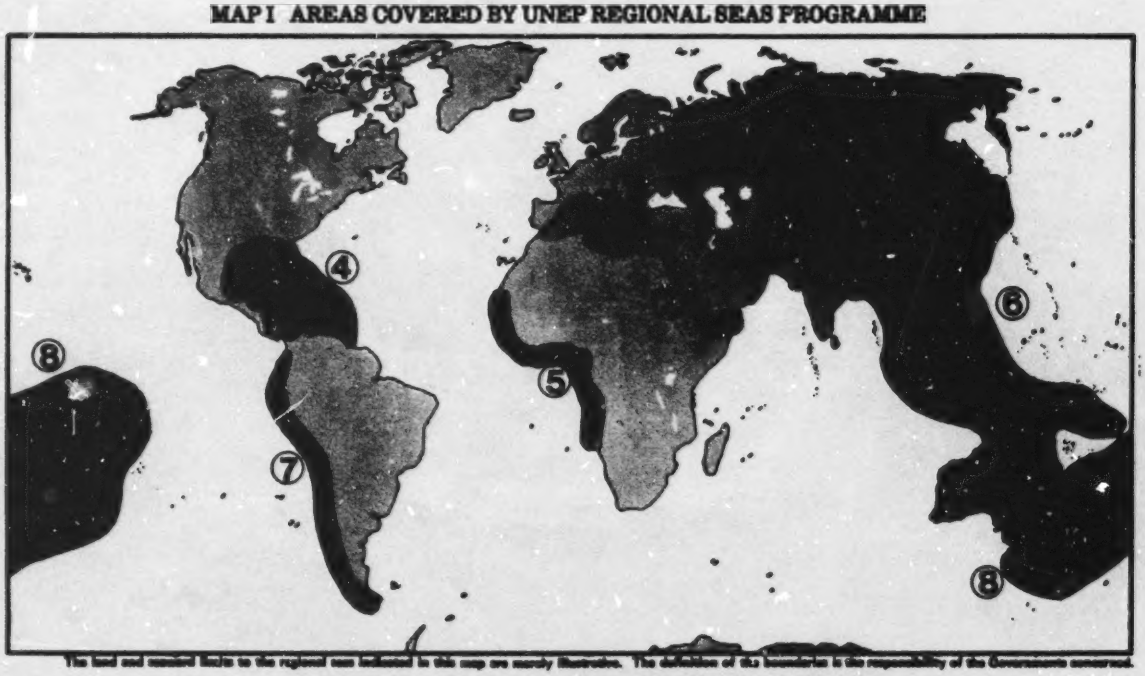
Overall, the Oceans program is an excellent illustration of Maurice Strong's "process is the policy" approach. Each of the Regional Seas programs takes inordinate "processing"—legally, scientifically, diplomatically. The Mediterranean has served as the model that the UNEP hopes can be used to transcend the political complexities of several other regions. The lesson is the process.

2. *Arid and Semiarid Lands* is the largest of UNEP's Terrestrial Ecosystems subprograms. The problem lies in the fact that arid and semiarid lands cover some 40 percent of the earth's surface. They are highly vulnerable areas that are being destroyed by erosion, overgrazing, loss of tree and ground cover, and other forms of human exploitation. The result is a major world problem of desert encroachment (Map 2). A further problem lies in understanding the process of desertification and the ways and means of combatting it. National and international institutions have not as yet addressed themselves sufficiently to the variety of climatic, socioeconomic, demographic, and technological issues linked with desertification.

The problem is elusive and for some regions still defies analysis. For example, we know that desertification occurs through both natural and manmade changes. Manmade changes are easier to assess and control, but in tandem with natural factors can prove of enormous complexity. Consider the manmade factors, plus wind variation, the rain shadow effect on leeward sides of mountains, the distance from the ocean, shifts in ocean currents, sunspot activity, upper atmospheric drift from volcanic dust, the reaction of dust to wind patterns, seasonal changes in temperature, humidity, rainfall, and so on.[7] Couple these factors with agriculture practices such as straight-row planting or other soil depletion activity and the difficulty of analysis multiplies.[8]

Tunisia is one developing country very much concerned about desertification. About half its 164,000 square kilometers lies south of the mountain range where the rainfall seldom exceeds 150 mm per year. Strong winds blow the sand covering everything in their path. Even villages are not spared. Many have been completely abandoned, with only a few traces of bare walls remaining. (UNEP photo/T. Farkas).

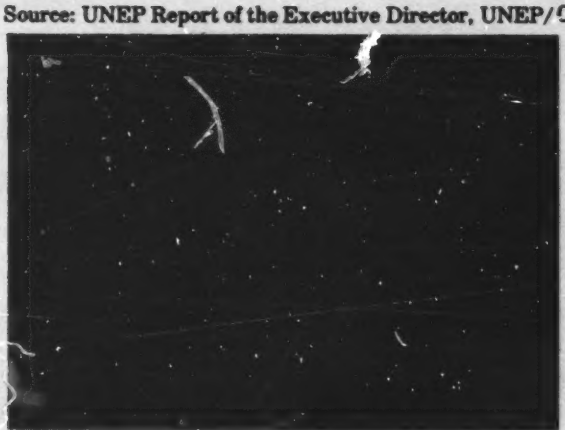
MAP I AREAS COVERED BY UNEP REGIONAL SEAS PROGRAMME



The land and marked limits in the regional seas indicated in this map are merely illustrative. The delimitation of its boundaries is the responsibility of the Governments concerned.

Action plans approved or awaiting approval:		Action plans in preparation:	
1. Mediterranean	4. Caribbean	7. South-east Pacific	
2. Red Sea	5. Gulf of Guinea	8. South-west Pacific	
3. Persian Gulf	6. East Asian Waters		

Source: UNEP Report of the Executive Director, UNEP/G.C. 6/7, 20 February 1978, p. 143.



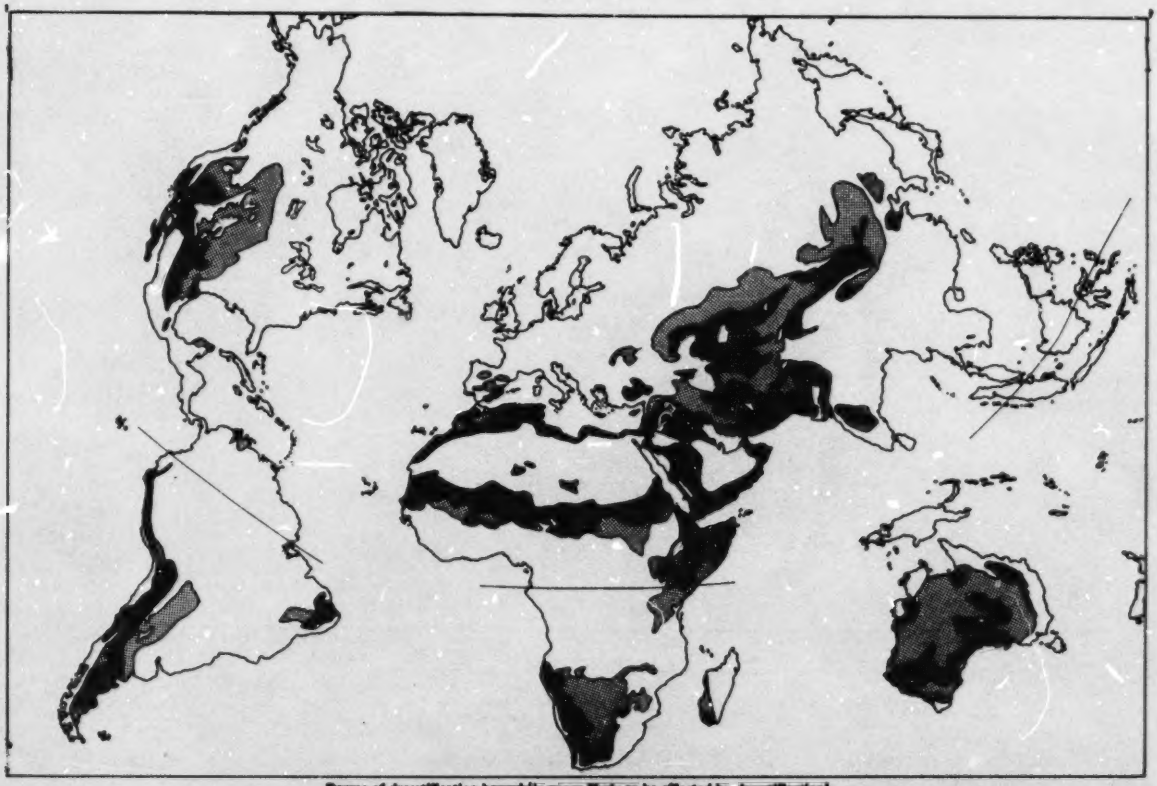
Wind-blown sand from the Nubian Desert advancing across rich alluvial agricultural land on the northern bank of the Nile near Korti in Northern Sudan. The picture was taken during a survey of desert encroachment carried out jointly by the Sudan government and the UNESCO UNEP Integrated Project (IPAL) in October 1975. (Photo, Dr. Hugh Lamprey).

Deserts have always ebbed and flowed at the margins, but today there is convincing evidence that desert conditions exist where lush vegetation once flourished. Most alarming, deserts are expanding at an increasingly rapid rate. Nor is the problem unique to one sector of the world. The African Sahel region is undoubtedly the greatest single problem area, but in the past decade desertification problems have touched large areas of Brazil, Chile, Afghanistan, Pakistan, Bangladesh, Egypt, Somalia, Ethiopia, Kenya, Botswana, and parts of Europe, China, Korea, and the United States.

The costs of such problems are enormous, both in terms of the human suffering and welfare relief needed (the Sahelian drought at its peak cost nearly one billion dollars), but also in terms of lost productivity of large crop and range lands, particularly when a growing world population badly needs food.

The UNEP approach, led by a career UN officer from Denmark, Jens Høgel, and a small staff in Nairobi, is to engage the desertification problem on three levels: work with governments

MAP 2 DESERTIFICATION HAZARDS



Degree of desertification hazard (in areas likely to be affected by desertification)

Very high High Moderate

This map is based upon The World Map of Desertification (A/CONF.74/2) which was accepted by the United Nations Conference on Desertification as a first approximation, primarily intended to indicate the global magnitude of the problem. (See UNCOD resolution 1 part II, para. 2 (a))

and nongovernmental agencies and scientific institutes, work within the UN family as a partner in desertification projects, and work with other sectors within UNEP. Each necessitates major efforts in coordination as the accompanying UNEP sketch of the agency illustrates.

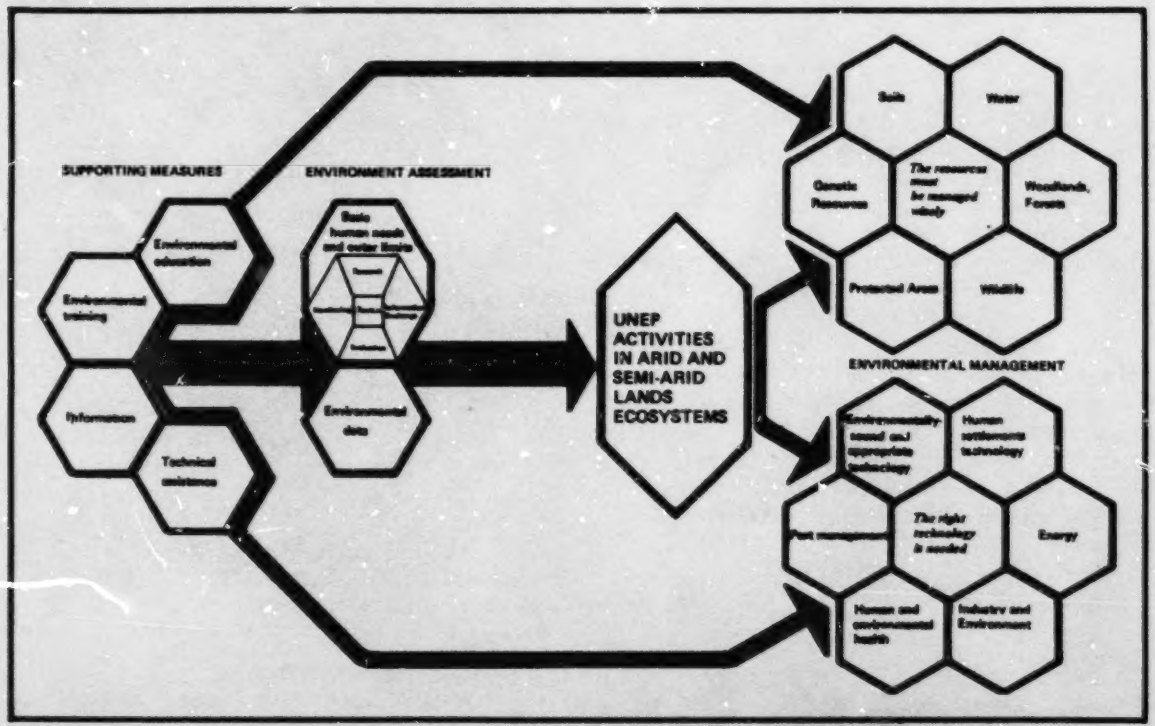
Part of the overall solution is to bring worldwide attention to the desertification issues. To this end the Arid Lands program took the lead in organizing the World Desertification Conference in 1977. Response to this conference, unlike Habitat, was favorable from the beginning, and helped re-establish the principle that world conferences are a good idea. As the *New York Times* (September 13, 1977) observed at the time: "Although none of the conferences has met everyone's high hopes, a strong case can be made that UN conferences have indeed catalyzed moments that...are essential... Environmentalism has been transformed from a 'luxury' concern... to worldwide acceptance."

Jens Høgel joined the Desertification unit in UNEP as Chief. He was formerly the Resident Representative of the UN Development Program (UNDP) in Upper Volta and had been with the UNDP since 1968. Before this, he was Professor of electronics at Ayacucho University in Peru.

The human and animal populations of desert and semiarid regions need help finding and maintaining reliable sources of potable water.

Specific project activities in the program include the establishment of a methodology to assess and map desertification areas. Research and demonstration projects on the nature and reasons for desert encroachment are under way and training courses on how to combat desertification are being taught. Other departures include work with urban centers near threatened areas, establishment of regional "green belts" to stop deserts from spreading, and preparation of plans of action to combat desertification.

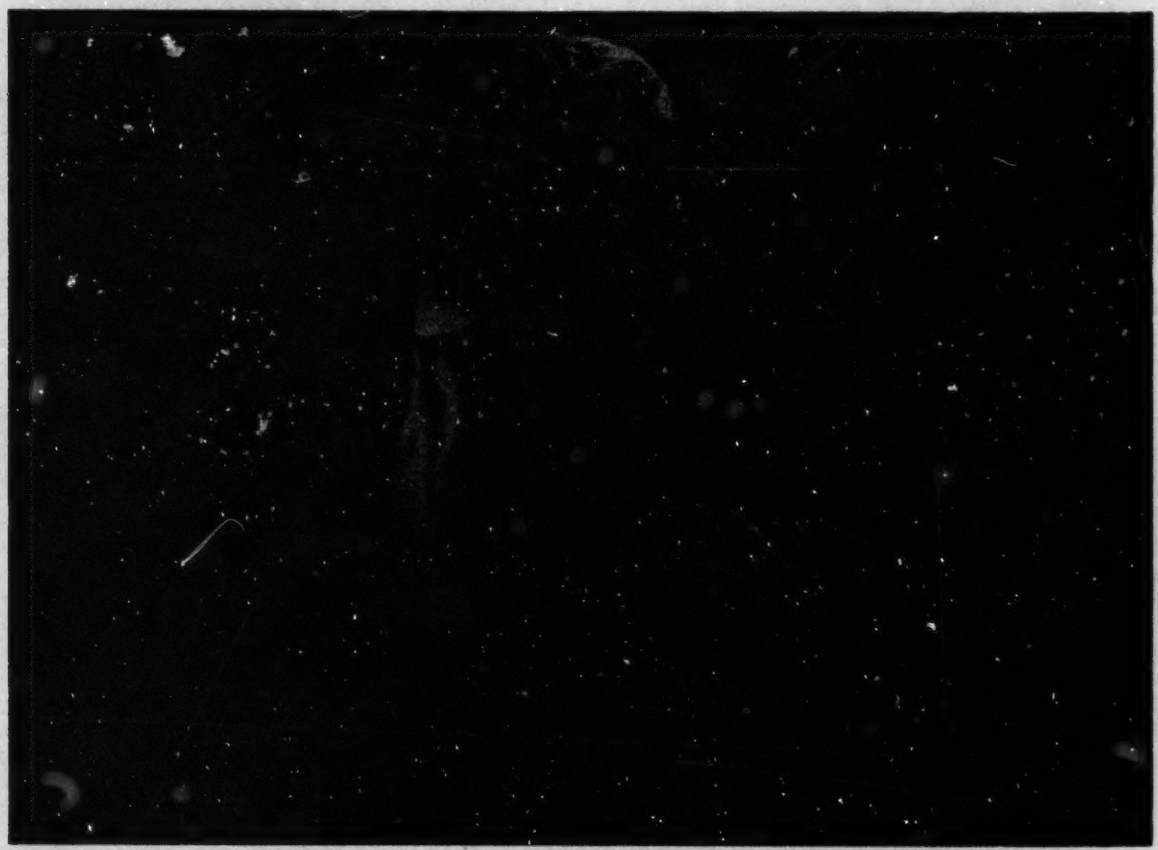
Overall the desertification problem probably takes UNEP further into dealing with social and behavioral issues than any of the current priority areas. The lesson is that such complex issues require an integrated project approach on a multidisciplinary basis. This should pay dividends in several areas. Model schemes in Kenya, Tunisia, the Sudan, the Sahel, and elsewhere are designed to provide transferrable insights and action plans for other regions in distress.



3. *The Global Environmental Monitoring System* (GEMS), a component of Earthwatch, is an internationally coordinated effort to assemble, analyze, and evaluate data concerning the state of the global environment. The core of the GEMS activities is partly financed by the UNEP Environmental Fund and coordinated by a UNEP unit known as the GEMS Programme Activity Centre (PAC). The PAC has no direct operational responsibility but works through projects implemented in cooperation with a number of UN agencies, primarily FAO, UNESCO, WMO, and WHO.

GEMS projects a modest low profile—it has a staff of four scientists, with Francesco Sella and Michael D. Gwynne serving at senior posts—and emphasizes the cooperative nature of its work. Still, its structure is complex. Activities are carried on at three levels and many of the decisions must be taken at three levels (Figure 8).

Francesco Sella, from Italy, is GEMS' Director. He served 14 years as secretary to the UN Scientific Committee on the effects of atomic radiation. Dr. Sella has a medical background and was engaged in genetic and epidemiological research before entering the UN.



Michael D. Gwynne, a senior programme officer, is a British ecologist with training in botany and zoology. Concurrent with his UNEP post, he is a senior research fellow at Oxford. Dr. Gwynne has done research in crop production, livestock, land use, and rangeland monitoring systems. His responsibilities with GEMS include establishing a global monitoring program for renewable natural resources such as tropical forests, soils and rangelands.

Figure 8

GEMS

The overall goals of GEMS are to monitor and assess environmental problems, and to improve systems of predicting natural disasters. The work lies mainly in four areas: health-related issues, climate issues, natural resource monitoring such as soils, forests, and rangelands, and issues related to ocean pollution.[9]

What have been some of GEMS problems? In all its activities, the GEMS PAC has had to insure that adequate methodologies were available for use not only by laboratories possessing sophisticated equipment, but also by those with limited resources. Analytical standards for calibration of methods had to be set to insure that individual laboratory results were comparable. Third, standard formats for the presentation of data had to be developed.

Within UNEP, monitoring and environmental assessment are grouped under the name Earthwatch. The cornerstone of Earthwatch is the Global Environment Monitoring System, known as GEMS. GEMS works closely with the World Meteorological Organization on the condition of the ozone layer, climatic changes, weather modifications etc., with FAO on the monitoring of natural resources, and with WHO on checking adverse conditions affecting human health.

The picture shows the diversity of land, sea and air based monitoring stations used in the frame of the first GARP global experiment December 1978—November 1979. (UNEP photo).

In spite of the difficulties, significant strides are being made and most GEMS activities now provide data on a routine basis that are published regularly. For example, 60 cities are providing data on air pollutants that may affect human health, and over 100 stations send data on the background levels of pollutants that may affect climate. The first phase of forest monitoring, now completed, has yielded data on the forest cover and its changes in three African countries. Plans are being developed to continue these activities in Africa and to expand them to other areas such as South West Asia.

In other fields, such as water quality monitoring, appropriate methodologies have been assembled or developed and 400 sampling sites selected. The data collection is being initiated.[10]

In the case of soil degradation, a methodology to assess it has been devised and has yielded small-scale maps of soil degradation rates and risks for Africa north of the Equator and for the Middle East. It will be tested on a larger scale in selected global areas.

GEMS activities have generated unprecedented momentum in only four years, and the promise that these approaches will enjoy both bilateral and multilateral support. Still, the progress of international monitoring remains frustratingly slow. As the GEMS structure implies, there are three layers of bureaucracy that need to be penetrated before any operational activities can be undertaken. Insuring the quality of the data, an essential requisite for their comparability, requires tedious and elaborate ar-

rangements simply to intercalibrate the different methods of data acquisition.

Perhaps the most delicate problem is that many countries regard monitoring equipment and data as a somewhat sensitive policy issue and a great deal of persuasion may be needed before agreement is obtained either for monitoring activity or the release of data. This depends on policies in individual countries, and the perceptions of individual administrations as to how data may affect national economic interests, particularly in the case of resource monitoring.[11]

In this regard, the GEMS story is unlike the Oceans program with its legal problems, or the Arid Lands program with its multiple social problems. Here a key issue—or the lesson—lies in the control and release of data. Paradoxically, the better the monitoring technology, including satellites, and the more useful it is for environmental purposes, the more it can encroach on national sensitivities. Usually the nations which exercise the greatest restraint are those whose knowledge gaps are greatest and whose people are most in need of the information monitoring can provide.

Ashok Khosla was trained at Cambridge University in natural sciences, and at Harvard University, where he obtained an M.A. and Ph.D. in experimental physics. After teaching at Harvard, he returned to India to work on questions of environmental policy planning, management, and information systems. He came to UNEP in 1976 to head the Infoterra division and more recently to chair the national task on Management Information Systems.

4. *Infoterra.* A second major component of Earthwatch is its information exchange activity, Infoterra (formally the International Referral System, IRS). It is directed by the Harvard-trained former head of India's Office of Environmental Planning, Ashok Khosla. Khosla's current passion is information systems, and his impact on UNEP, both in his Infoterra post and as head of an internal management information task force, is considerable.

The basic environmental problem addressed by Infoterra is not the lack of information, but how to systematize the glut of worldwide data relating to the environment. The challenge is one of structuring information channels so that the best, most recent data are available to those who need it. When UNEP was created, no effective international mechanisms existed to put those seeking environmental information in touch with those who could provide it. Infoterra was established to fill this gap.

How does the system work? First, Infoterra's overall objective is to insure that environmental decision-makers have access to the best data available. This is done through a decentralized network of national "focal points," processing in 96 nations. The nations represent some 97 percent of the world's population. As a partner in the network, each country sets up the system, first for its own environmental use, and thereafter for regional and international data exchanges. The Infoterra role is to stimulate cooperation, suggest priority areas, help coordinate the network, and strive to avoid duplication between national systems.

Through its network of focal points, Infoterra carries out several specific activities:

- the collecting, coding, and classifying of sources of environmental information and maintaining those sources in an international directory.

- the transmitting to Infoterra's Programme Activity Center in Nairobi data to be included in the Infoterra International Directory for worldwide use.

How Infoterra Divides the World
Major Environmental Subject Areas for Information

1. Atmosphere and Climate
2. Oceans, Seas, and Estuaries
3. Fresh Water
4. Energy Resources, Supply and Use
5. Nonrenewable Resources
6. Chemical and Biological Agents and Processes
7. Physical Energy Phenomena
8. Disasters
9. Renewable Resources
10. Land Use and Misuse
11. Food and Agriculture
12. Wildlife—Animals and Plants
13. Recreation
14. Population
15. Human Settlements and Habitats
16. Human Health and Well-Being
17. Transportation
18. Technology and Industry
19. Monitoring and Assessment
20. Management and Planning
21. Socioeconomic Aspects
22. Education, Training, and Information
23. Subject Disciplines
24. Geographic References
25. Pollution
26. Wastes

the handling of requests from users.

The main tool used by Infoterra is an International Directory of Sources for environmental information. The Directory is available in printed form, on magnetic tape, or on microfiche, and can be scanned manually or by computer. The January 1979 edition contains some 7,000 sources from more than 65 countries, and covers over 1,000 different environmental topics. It is updated quarterly and available in English, French, Russian, and Spanish. The system divides environmental problems into 26 major subject areas.[12]

Infoterra receives numerous question from all over the world. Some of these will be handled directly, as, for example, an inquiry about soil degradation in the tropics on which UNEP will supply a list of sources offering current information on the topic. In other cases questions will be referred to national focal points. Typical questions involve inquiries about treating waste water with village-level technology, about graduate-level courses in environmental management, or about solar power generation and solar heating. Another question may concern the exact international regulations for export, import, and transit of toxic chemicals.

In spite of marked success, the Infoterra system is not without problems, as Ashok Khosla notes:

All information networks, however well designed, suffer from inadequate use—as well as from limited capabilities to respond fully and precisely to the changing needs of their users. In decentralised networks such as Infoterra, these problems are further compounded by the absence of any enforceable authority over the network participants.

A second issue involves who will have access to the system.

...governmental users were seen to be the prime clients, but it has always been agreed that any user whose actions can have an impact on environmental quality should have access to the system. How to maintain some control over the flow of information and who is to use and have access to the information is a question that each focal point office is asked to decide. Some countries use less control than others.

Overall, however, Infoterra is regarded as an ideal UNEP program. It involves extensive international cooperation and coordination, it uses modern management and information tech-

niques, and it relies on national systems to do much of the work. In this respect it represents one of UNEP's cherished goals: getting others to help carry the environmental burden.

Part III: Growth Pains: Problems and Prospects

The overriding problem of the new United Nations Environment Programme is the enormous scope of its mission. UNEP was designed to be the environmental conscience of the UN system, to assess, monitor, and help manage the world's environment. Fortunately, the UNEP staff have a "one step at a time" approach, and most are refreshingly willing to discuss the agency's difficulties. Aside from the scope of the mission, some of these concern the limited funding, the differences in management philosophy among the staff, and the distances between UNEP's East African location and the agencies with which it works. Other tribulations, ironically, are the result of UNEP's marked successes, which have led to higher expectations than can be fulfilled. The issues divide roughly into two camps: the external problems and the internal management and operational issues.

The External Issues
Mission Impossible?

UNEP works as a catalyst and coordinator. It is designed primarily to serve other agencies by providing guidance, stimulus, and funds. It is an information-giving, early-warning agency which is not set up to take direct action nor to engage in technical assistance but to apply leverage. Herein lies a key problem. The nonoperational nature of UNEP removes it from the activities it commissions, and reduces the control it has over them. It is a situation which has led one observer to characterize UNEP as a toothless tiger trying to wield authority from a distance.

The toothless image is only partially true, since UNEP does exert diplomatic pressure, often with some dexterity. It is true, however, that the limited budget and the need to work in tandem with dozens of agencies has led to an emphasis on persuasion rather than direct operational involvement.

Because of its broad scope and operational disengagement, UNEP's mission is often misunderstood and occasionally attacked. Several Arab states, for example, have accused UNEP of being structured to serve the West. They argue that the grinding issues faced by poor nations are not adequately addressed by the agency, which either helps or goes along with a worldwide confiscation of resources by the industrial states. The shriller spokesmen suggest UNEP is the handmaiden of the developed nations who are only interested in keeping their access to raw materials, of keeping the Third World population down, and of seeing the wild game roaming free. UNEP is unjustly caught in such polemics because, like other UN organizations, it will not respond aggressively to set the record straight.

A Political Balancing Act

In UN circles it is popularly held that international civil servants do not engage in political activity. This may be the rule when dealing with internal matters of nations, but it is not the case within the UN family and within environmental agencies. Most of the senior UNEP jobs are intensely political and involve the full range of tools in any political system: diplomacy, pressure, leverage, threats to withhold resources, and outright coercion. That UNEP has done so much in so short time is an indication that it has been politically successful in many of its struggles. Part of the reason behind this success is the newness of the organization, the enthusiasm engendered by its staff, and a degree of mystery about what UNEP really does.

Nonetheless, it is a difficult balancing act to maintain. UNEP's staff must be very sensitive to the nuances in a wide range of environmental organizations, including the UN family agencies where turf issues can be particularly difficult. In the UN family rigid compartmentalization hinders UNEP's attempts at coordination and occasionally sets up a "we vs. they" attitude. Liaison officers in UN organizations who are supposed to facilitate cooperation are often caught between extending information and protecting the interests of their own organization. As a result they either temporize or refuse to cooperate.

Even under the best of circumstances UNEP's role in the UN family is complicated by the five languages in which the UN operates, by the wide range of cultural attitudes found among the international staff, and by the far-flung location of the other UN agencies.For UNEP, New York, Geneva, Paris, and Rome are all long flights from

Mr. George Kamau Mukoho, UNEP Director of the Division of Information since September 1978. In 1975 Mr. Mukoho was elected Chairman of the Preparatory Committee for HABITAT: The United Nations Conference on Human Settlements. Born in Kiambu, Kenya in 1938, Mr. Mukoho trained as priest in Kenya, Tanzania, and Rome, Italy. From 1974 until his appointment to UNEP he was the Director of the National Environment Secretariat in the Office of the President in Kenya. He has represented his country at several international conferences and he has attended every session of the UNEP Governing Council. (Photo UNEP/A. Kasoro)

Nairobi. In fact, UNEP's Nairobi base is a particularly sensitive political issue in itself.

The Location Issue

Its East African base makes UNEP the first, and until recently the only UN agency in a Third World country.[13] When taken in 1972, it was an important, symbolic decision which carried both advantages and disadvantages. African leaders have argued that the political importance of UNEP's location outweighs all other considerations. UNEP was the first UN agency that broke the pattern of being headquartered in Europe or the United States. In the eyes of Third World leaders, this was a partial redressing of the balance. Such euphoria accompanied UNEP's choice of its Nairobi base that there was concern the organization had been "captured" by Africa and that African countries would set all the priorities. This has not been the case.

In another sense, there was symbolic importance based on the fact that many of the world's environment problems are the result of patterns that can and must be changed. By coming to Nairobi the organization was serving notice from the very start that it was willing to change existing patterns. In the view of many Third World observers, it was high time.

Those who underscore the disadvantages of the Nairobi headquarters point to a sense of isolation from other UN activity. In Geneva, where UNEP was initially headquartered, experts were easy to reach by telephone, consultation visits were not difficult to arrange, and all of Europe was available as a talent pool. In Nairobi overseas consultants require expensive air tickets and large per diem costs.

If UNEP had stayed in Geneva it undoubtedly would have operated more efficiently on environment problems in industrial countries, and been a smaller, more compact organization. The agency is now three times larger than planned.

On a more personal level, some of the UNEP staff are less than enthusiastic about UNEP's location. One senior officer summed up the views of several staff: "Nairobi is enormously expensive; most of our work is in other parts of the world; the air fares out of here are enormous, my family is having trouble adjusting, and half the time the phones don't work."

Reaction to UNEP by local environmental specialists, both European and African, is also somewhat ambivalent. A Kenya lecturer points to an "unfortunate lack of interest in the University of Nairobi, where there is considerable strength in environment areas." A Canadian writer expresses the concern that there is an overconcentration on Third World issues, particularly poverty, "without understanding the dependency theories of development." One American analyst voices what is perhaps the most common criticism, that "UNEP takes on too much, which causes many important issues to fall between the cracks."

On balance, UNEP has excellent relations with the Kenya government, and there are compelling reasons why it makes limited use of independent local experts. The Kenyan capital is unique as a communications and research center. It is far more open to academics, consultants, research

firms, and publishing activities than practically any country in Africa. There are a large number of African and European professionals in the country who are concerned with environment. UNEP simply cannot use many of these talents on the basis that specific favor to people in one region of the world would be to exclude others.

Financial Limits

The program funded by UNEP has an annual budget of some $30 million, which is projected at that level for the next several years. Nevertheless there remains a great deal of uncertainty about

Mr. Victor Johnson, Chief of Environmental Education and Training. UNEP HQ Nairobi, Kenya February 1979. (Photo UNEP/A. Kasoro)

future funds, a situation which creates a staff problem. Job security is nonexistent, and the idea that no one is ever sacked within the UN system is simply not true. Most appointments have no tenure, and contracts are very dependent on the financial realities.

Part of the funding problem is that national contributions are not coming in as rapidly as UNEP had hoped. There is also an awkward liquidity problem in that the U.S.S.R., Indian, and most East European governments pay part of their pledges in their local currencies, which are not convertible. In India and Eastern Europe the money can usually be spent internally, since UNEP has projects in these countries or needs their goods and services. In the Soviet case, however, 75 percent of the funds are blocked. The U.S.S.R. is a major contributor, and UNEP can neither use all the available rubles internally nor buy enough Russian goods and services to use up the allocation.

A further problem is that UNEP payments into the Fund in accord with pledges have also been slow. Major contributors such as the United States and Canada have lagged behind in their payments, ostensibly waiting for evidence that UNEP really needs the money and could use it wisely.

Another unfortunate element in the financial picture is that the developed countries whose contributions largely support UNEP, [illegible] less need for UNEP services than do nations in the developing areas, who pay proportionately far less. This creates a kind of financial [illegible] and an ongoing challenge: can UNEP [illegible] masters?[14]

A Few Examples of How UNEP Has Spent Its Money

Environmental Health. Evaluation of toxicity of environmental chemicals, a $101,000 WHO project of which the UNEP Fund is contributing $46,000.

Information. World Environment Day, a $500,000 internal UNEP project, and a $165,000 internal UNEP project to develop a series of media training seminars.

Industries. Development of an ongoing consultative relationship with specific industries, a $725,000 internal UNEP project.

Tropical Forests. A pilot project on monitoring tropical forest cover, a $1,058,000 FAO project of which the UNEP Fund is contributing $557,000.

Wildlife and Protected Areas. A program to develop a strategy for ecosystem conservation, promotion and coordinated action, a $3,099,000 IUCN project of which the UNEP Fund is contributing $1,555,000. (For the period 1974-1980, UNEP has committed some 4.9 million dollars toward progress in this area.)

Left to right: Mr. George Muhoho, Director Information Division UNEP; Mr. Sanchez Vicente, Assistant Director Environment Fund UNEP; Mr. P.S. Thacker, Deputy Executive Director UNEP; Dr. Mostafa K. Tolba, Executive Director UNEP; Mr. J.J. Graisse, Chief External Relations Officer UNEP. (Photo UNEP/A. Kasero)

The Internal Issues

Philosophies of Management

There are essentially two philosophies of management that vie for favor within UNEP. One emphasizes hierarchy, status, centralized power, and the old-fashioned system of running things from the top. The other emphasizes collegial relationships on an egalitarian basis, cooperation across organizational lines, decentralized power, and working for "tasks" rather than for "directors."

The hierarchical approach is very European, very much the tradition within the UN system, and is embraced by most of the European senior staff or those trained in Europe. Power is held in the hands of the directors. To direct a large staff is to have attained prominence.

Proponents of the colleague-cooperation philosophy argue that the old system slows the work, hampers cooperation, frustrates enthusiastic, task-oriented people, and actually hurts morale. Advocates of this less-centralized authority system would choose the title "coordinator" over "director."

The tension created by the two approaches may in fact have some positive effects. If both schools hold sway, top executives have the opportunity to move from one system to the other. They can encourage the collegial approach for some problems, but when it is deemed necessary, can exercise absolute power from above.

On the other hand, coexistence of the two philosophies creates confusion and uncertainty, especially for the middle management who in theory should be innovative and highly motivated. As most UNEP employees have no job tenure, the situation can lead to a morale problem, based on uncertainty of one's place, stress, and frustration.

The Search for an Image

It is difficult to focus on exactly what UNEP does. For an outside observer, the catalytic mission seems vague, without the clear immediacy of such agencies as WHO (Health), UNICEF (Children), or FAO (Agriculture). Part of the problem lies in the changing nature of UNEP. At least five organizational charts have been drafted in recent years. None of them, according to top management, accurately reflects UNEP's dynamic nature. By necessity there are different types of subunits doing different jobs, a kind of three-dimensional crosscutting management that includes program activity centers, divisions, offices, task forces, committees, and outside projects. To outsiders, including important funders, it can be very confusing. UNEP was called a "liaison process between a crowd of subject-controlled groupings," by one consultant,

"a gaggle of people engaged in memorandum warfare," by a less diplomatic observer. Both are overstatements since UNEP is no more encrusted with bureaucratic procedures than most corporations or government agencies.

Confusion on the image also occurs because some of UNEP's activities are within defined fields, which have their own organizations and networks of people such as the energy or environmental health fields. Other activities are in new fields which UNEP has essentially created. They have perceived a problem, stimulated an awareness of it, and begun to form a new network to cope with it. This is essentially an alarm system. Such issues as desertification, ocean pollution, the state of world water resources, and the growing shortage of firewood are examples. The practice essentially creates two faces of UNEP. In one case UNEP is working in established fields as a coordinating partner; in the other they are developing totally new fields. The two different functions set up very different internal activities and a different public image.

Search for a Management Process

UNEP recently engaged an outside management consultant to focus specifically on the information and internal communication aspects of the organization. His analysis did not meet with universal applause, but again it did bring out the refreshing ability of the UNEP staff to think openly about its problems. The central issues pinpointed in this assessment were those of information flow and the internal organization of the various units. Some of the specific findings confirm UNEP is having difficulty arriving at an organizational structure that is readily understandable to outsiders. There is confusion as to the nature and function of the organization's groupings, such as task forces, program activity centers, divisions, and offices. As a result routine coordination between units is minimal and routine decision-making is often late. More worrisome, until very recently, financial forecasting has been uncertain, a fact that has led to more institutional stress than any other problem. Similarly, programmatic forecasting is usually on an ad-hoc, unsystematic basis. As a result, some of the potential for program activity is not realized because recipient organizations are either caught unaware or totally lack information about UNEP resources. In fairness, some of the management problems currently found in UNEP are a part of a shakedown process of a new agency.

At the core of the management problems is the recruitment of senior staff. UNEP, like environmental agencies at the state and local level, has difficulties recruiting staff who combine both scientific and managerial skills. The realities are that two staffs coexist, or try to coexist. One effect of this dichotomy is that scientists produce a great deal of technical, project-oriented materials, and the management staff produce overlong reports on administration and finance to justify their activities. The upshot is that both types of reporting are difficult to boil down for strategic management needs. Information tends to be analyzed into separate parts rather than synthesized into an overall picture.

A further complicating staff factor is that in each program area, such as wildlife, soils, or energy, there is an international network of activity specific to the program area. The international wildlife network, for example, has key leaders and organizations with which the UNEP wildlife official must deal as a catalyst and coordinator. In addition, the staff member must also know the UN family staff counterpart, such as the person in FAO who focuses on wildlife *and* know the vast world of the nongovernmental organizations (NGOs), the clubs, and private sector influentials. A further demand is to have an understanding of both the scientific literature in the field, and the main themes in the more general literature. All these talents must be combined with tact, diplomacy, and dedication.

A second problem area for management concerns communications and particularly information flow. Information is generated, stored, retrieved and used; as in similar new agencies, it is also misfiled, ignored, and lost. Better flow of data and better analysis of its pathways are at the core of the problem, but several related difficulties persist.

- Policy and strategy decisions are slowed by information in a form that defies quick understanding. Some of this is scientific data that is difficult to reduce to an easily transmittable form because a specialist on the topic is needed to

decide what is crucial for transmission. Because of the time and cost involved, this work is usually not done, and the "long form" is put forward. The result is an information bulge of sizable proportions.

Related to the reduction problem is the fact that documentation is the end result of many efforts. Reports, memos, and papers produce an avalanche of words, seemingly to justify a program's existence. The documentation is often ponderous, hard to digest, and unclear as to its intended audiences. There is also a UN style of writing, most kindly described as "mild and uncritical," which permeates most reports.

- For most environmental problems there is an imprecision as to who the target audiences are that UNEP should reach to effect change on the issue. Admittedly, this is a difficult analytical problem. "Who governs," even in a small community with an environmental problem, may be difficult to pinpoint. When the scope is wider it may be nearly impossible to identify the key decision-makers.

UNEP's Goals: Are They Being Met?

In a Machievellian sense, all the current problems faced by UNEP are secondary if the agency is meeting its basic objectives. Here, the end indeed justifies the means. At UNEP's Fifth Governing Council in 1977, 21 specific goals were set forth for UNEP to accomplish by 1982. To make at least a superficial judgment of how each UNEP goal was progressing, I conducted interviews with UNEP staff, reviewed UNEP documents, and discussed performance with environmental specialists in East Africa (see Worksheet Status of UNEP Goals).

The status of the 21 goals in April 1979 was as follows:

	Total Number of Goals	
Goal complete or exceptionally far advanced	2	+++
Good progress toward goal; ahead of schedule	5	++
Progress under way; approximately on schedule	7	+
Questionable progress toward completion of goal by 1982	3	o
Slow progress; behind schedule	2	-
Very slow progress; behind schedule	1	--
Goal changed or abandoned	1	---

Based on this admittedly rough and ready assessment, it may be concluded that UNEP is indeed succeeding on many fronts. A new international organization of this complexity would inevitably have had a turbulent beginning and a protracted period of adjustment. That most of the senior staff are able to work with the enormous scope of the environmental mission, to live with the uncertainties endemic in the UN structure, and to accomplish so much—with a total staff from top to bottom of some 300—is extraordinary.

Acknowledgments

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WORK SHEET - Status of UNEP Goals

	Goal	Current Status (April 1979)
1. *Global Monitoring*	An operational GEMS with results available evaluated and published.	Good progress. Ahead of schedule with maps related to pollution monitoring now available and methodologies for assessment in several sectors also available. Goals well ahead of schedule. ++
2. *Infoterra*	An operational Infoterra with nearly all countries having registered sources and making use of the service.	Goal attained 1979. Fully operational system. Countries active in system have over 90 percent of world's population. +++
3. *Toxic Chemicals*	The IRPTC in a position to issue warnings and technical publications.	Progress being made; bulletin now being published and warning system being built. On schedule toward goal. +
4. *Periodic Reports*	Periodic state of the environment reports and the issue of the lst quinquennial report.	Going well, and on schedule. +
5. *Advice to Governments*	Concrete advice for use by governments in dealing with priority pollutants.	Essentially being carried by IRPTC (goal 3) and in collaboration with World Health Organization. Slow progress toward goal. o
6. *Health*	Implementation of action plans to demonstrate environmentally sound methods of controlling schistosomiasis, malaria, and cotton pests.	Schistosomiasis has been a major priority; work on malaria and cotton pest behind schedule. Slow overall progress. -
7. *Desertification*	Concrete achievements in the implementation of the plan of action to combat desertification, advance implementation of a worldwide tree program and publication of guidelines to control soil degradation, and a worldwide system of pilot and demonstration projects in rational management of water resources.	Desertification is a major program area handicapped by lack of national political will and shortage of funds at the international level. Action plans partially in place and programs under way in Kenya, Sudan, Tunisia, and West Africa. Program on schedule toward goal, but expansion needed to meet overall goals by 1982. +
8. *Microbiology*	A global network of microbiology resources centers to conserve microbiological resources and apply them in environmental management.	Four centers established, satisfactory progress. +

	Goal	Current Status (April 1979)
9. *Conservation*	Development of a global plan for the restoration, conservation, and management of wildlife; establishment and management of a network of parks and other pro-protected areas.	Global plan of conservation strategy nearly complete (third draft approaching completion). Management of a network of parks on schedule, but largely dependent on government implementation. ++
10. *Development*	Advice on environmentally sound patterns of development, including rational and nonwasteful use of natural resources and eco-development, for use nationally and internationally.	Identification and definition of problems good; UNEP has been slow to get into a position to provide advice. Progress uneven, best in contact work under way in Europe (ECE), but other regional efforts now active. o
11. *Planning*	Tested guidelines and methodologies in the proper integration of environmental concerns into development planning processes for use by governments and international organizations.	Technical guidelines have been developed in only a few sectors, but have not been tested. Good progress on establishing methodologies for the integration of environmental concerns into development planning. Overall progress mixed. o
12. *Rural Technology*	A global network of institutions to test, apply and publish advice on appropriate and environmentally sound technology particularly for use in isolated rural areas.	Program is on track, but hindered by lack of funds. Excellent plans have been evolved and key institutions identified, although network is not in place. +
13. *Industries*	Guidelines on reducing the adverse environmental impact of specific industries, including advice on industrial location, for use by governments and industries.	Good progress. UNEP only one of several agencies working in this area. A major World Bank study recently completed had UNEP cooperation. +
14. *Regional Seas*	Adoption and implementation of action plans for each of the regional seas covered by UNEP programmes.	Well under way, especially Mediterranean and Kuwait agreements; major area of success for UNEP. +++
15. *Early Warning System*	Initiation of an operational, worldwide early-warning system for natural disasters.	The original goal not expected to be met and has been changed to focus on application of new techniques and improvement of existing facilities. Overall work involves eight UN agencies, which are behind schedule. ---

	Goal	Current Status (April 1979)
16. *Education*	Advanced implementation of plan of action for environmental education; full functioning of the program activity center on environmental education and training.	Successful and ahead of schedule in Africa; other regions not begun. +
17. *Communications*	Established procedures for effective communications with governments and information to the public at large.	Mixed current picture; some units within UNEP have excellent programs (Infoterra, GEMS, Regional Seas, Division of Information). Bulletins and newsletters have been established. Other areas have poor communications with government. +
18. *Technical Assistance*	A fully operational technical assistance clearing-house facility.	Not very far along. Internal clearing house actually under way but the program struggling for support and needs cooperation of national governments. -
19. *Conventions and Protocols*	Achievement of wide acceptance and application of existing and future international conventions and protocols in the field of the environment.	Excellent achievement in this area, led by projects in Regional Seas, in endangered species, migrating birds and others. One setback has been the failure of goals at the UN General Assembly to approve recommendations on shared resources (see below, 20). ++
20. *Inter-State Relations*	Agreement on principles to guide states in interrelations of shared natural resources, problems of liability and compensation for pollution and environmental damage, weather modification, and risks to the ozone layer, and codification of those principles into international treaties.	Good progress. Several recent achievements include: establishment of an ozone bulletin, agreement on principles and initiation of working groups on liability and compensation in regional contexts. ++
21. *Management*	Development of the capacity to provide comprehensive and practical advice on the implementation of environmental management, based on the outcome of relevant work throughout the program.	Behind schedule, slow progress due to shortage of staff and resources. This goal is dependent on progress in other UNEP programs, especially goals 5, 9, 10, 11, and 13, where problems remain. --

Appendix A

UNEP Programs in Environmental Management

The following brief descriptions focus on two questions: the central problem faced by the program, and the solutions being attempted.

1. *Oceans* (discussed in text)
2. *Terrestrial Ecosystems*

a. Arid lands and semiarid lands (discussed in text).

b. Tropical Woodlands is a program that concentrates on tropical ecosystems in Asia, Africa, and Latin America. The problem: Human encroachment and destruction of the ecosystem can have dire effects on rainfall and food production over vast areas. These fragile ecosystems must be managed until economic development and social equity can be attained by people who exploit the forests.

Part of the solution: To emphasize to governments with these endangered ecosystems that the human beings in the areas form a total relationship with the rural environment and that their economic well-being will have to be improved before pressures on the forest lands can be reduced. Some of the specific project activities include a pilot project launched with UNESCO's Man and the Biosphere program which provides research and training in nine countries of Asia, Latin America, and Africa. A research conference concerned with these questions was held in Hamburg, Germany, in 1977, and a series of agro-forestry training programs have been organized for career officers from several nations.

c. Mountain, Island, Coastal and Other Ecosystems are grouped in a program that encounters the same issues as those of tropical woodlands. The problem: To protect the ecological basis for human life through increased land management. Part of the solution: To launch a major project for the Andean region which focuses on research into ranching with training activities and information services. The second phase of the project concentrate on problems of human settlement, migration, tourism, conservation, watershed management, and land use. Coastal priorities include the management of mangrove and estuary ecosystems. The Mediterranean and the South Pacific have had projects as a part of the UNEP Oceans programs and at workshops organized around coastal problems in Manila and Bangkok in 1977 wherein UNEP was co-organizer.

d. The Soils program is primarily concerned with the ongoing degradation and destruction of soils around the world. The problem: Soil degradation affects the production of biological raw materials and the very functioning of the biosphere itself. A complex interaction of various factors involves soil erosion, soil degradation and loss of soil fertility. Part of the solution: To focus on getting a clearer understanding of these interactions and to use this information to prepare international soil policy guidelines, and legislation which will promote proper land utilization and soil conservation.

e. Wildlife and Protected Areas is perhaps one of UNEP's more political areas, since wildlife is a highly controversial problem in East Africa, UNEP's home territory. The problem: Population pressures and economic expectations cause more and more of the earth's previously unexploited ecosystems to be exploited, regardless of ecological advisability. At the same time scientific knowledge grows and indicates that it is desirable to maintain part of the earth's ecosystems in natural or seminatural states in order to preserve the biological stability of the earth. Unfortunately, such opportunities are rapidly disappearing, especially in the tropics and subtropics. Opportunities should therefore be seized to preserve samples of ecosystems which have enormous scientific, educational, cultural, esthetic, recreational, and economic value to mankind.

Part of the solution has been to establish an "Ecosystems Conservation Group" which has both international and regional concerns. The group has drafted a world conservation strategy that indicates priorities for governments and organizations concerned with conservation. This strategy forms the basis of advice on conservation legislation, training, public information, national parks, wildlife conservation, and land use problems. Other global activities include the establishment of biosphere reserves, promotion of the "islands for science" concept, and work toward

harmonizing national parks legislation. UNEP endorses the Convention on Conservation of Migratory Species of Wild Animals. It also provided secretariat services for the Convention on International Trade in Endangered Species of Wild Fauna and Flora. UNEP aided in such implementation measures as preparation of identification manuals, guidelines for shipment of live specimens and exchange of museum specimens, and training programs.

f. *Water.* The problem: Population growth and other economic and social circumstances have generated concentrations of populations at points where the demand for water has far outgrown the locally available supply and where the quality of water has been degraded. For other people the accessibility of water is limited and clean water may be unobtainable.

Part of the solution: UNEP has helped organize field demonstration projects in improved water supply systems in Africa, Asia, and Latin America. Each project makes use of locally available expertise, technology, and manpower, and each is designed to gain local community involvement. Participation is promoted through research, training, education, and information workshops. Another activity includes the gathering of information on sound technologies for rain harvesting, treatment and storage, and the promotion of ecologically safe waste disposal systems. A program of environmental protection in lake and river basin development involves such elements as flood control, dam and reservoir construction, and irrigation schemes. The long-term objectives of this water program include improving the cleanliness and productive capacity of rural and urban water supplies, the management of water resources, protection of water from pollution, combating desertification, encouragement of public participation on better water use, and strengthening existing international networks of water research and development.

g. Genetic Resources. The problem: A serious paradox faces man in his efforts to improve breeds of animals and varieties of crops. He works with limited gene pools and squanders the naturally rich genetic basis by accentuating and modifying the evolutionary process. These problems can only be reconciled by insuring that there are large gene pools of plants, animals, and micro-organisms. With larger gene pools there will be continued advancement in breeding improved varieties to meet ever-rising requirements.

Part of the solution has been to set up microbiological research centers in East and North Africa, Southeast Asia, and Latin America. This network is linked to support centers in developed countries which provide technical training. Projects include recycling of wastes (Bangkok), biotechnology (Cairo), and nitro-fixation (Nairobi). In another project area, crops, trees, and animals are being studied in respect to their potential genetic diversity. The aim is to save endangered species such as the eucalyptus and pines in Asia and Africa, and to study domestic farm animals which are genetically rich or have developed special environmental adaptations. A similar program is contemplated to review the genetic resources of fish.

3. *Energy.* This program focuses on the basic problem of the world's energy shortages and the depletion of energy resources. Part of the solution centers on the search for alternative energy sources such as solar energy, wind, and biogas. One of the keys lies in the conservation of existing sources of energy, another in insuring that the environmental dimension in energy research receives greater attention. To this end UNEP will establish three rural energy research centers in Asia, Africa, and Latin America.

4. *Natural Disasters.* The problem in this area lies in the extreme economic loss and human hardship caused by tropical cyclones, floods, and earthquakes, as well as enormous ecological damage. At the international level both the disaster and its consequences are the concern of various UN bodies which make efforts to coordinate the prevention and follow-up rehabilitation.

Part of the solution: UNEP's work in this area includes developing a reliable worldwide early warning system and the technical ability to make reasonably accurate forecasts. Specifically, an early warning system for tropical cyclones in the Caribbean and Central America is planned using polar-orbiting and geostationary satellites. Other activities include the improvement of earthquake forecasting and prediction and the development of a series of monographs on various aspects of

natural disasters. These include a manual on post-disaster reconstruction, and a study of the water management problems arising from droughts and floods. Plans are also under way to expand the cyclone warning system to other regions of the world and to begin an operational, worldwide early warning system for the full range of natural disasters.

5. *Environment and Development*. This program cuts across all environmental areas and focuses on the inherent conflicts between man's development activities and the protection of the environment. The program has defined "good development" as that based on scientific understandings of ecosystems and the "rational" uses of the environment. Location of factories, restoration of destroyed landscapes, and creating an awareness of the pitfalls in unrestrained world market competition are a part of these activities.

Part of the solution has been to hold regional and international seminars on alternative patterns of development—to test and improve concepts of eco-development through demonstration projects in both developing and developed parts of the world, and to formulate environmental considerations for the new international development strategies. Other program activities include execution of an action-oriented study on environment/development relationships in Kenya's planning and development process and development of methodologies and decision-making approaches for incorporating environmental considerations into national planning.

In another area the unit has undertaken a review of the environmental aspects of seven industrial sectors: pulp and paper, aluminum, motor vehicles, petroleum, chemicals, iron and steel, and agro-industry. For each a computerized information storage and technical data on the sectors is published. The unit work with governments and international organizations on how to apply its findings and recommendations on these environment-development relationships.

6. *Human Settlements and Human Health*. The goals of the settlement portion of this major program have been to research and apply environmentally sound technologies to human settlements problems around the world. A group of regional networks has been organized to carry out the work appropriate to their different regions. Some of the types of technologies that have been developed:

a. Low income housing built with local materials that are energy efficient and involve waste recycling and water conservation.

b. Water conservation and detection for different kinds of settlements.

c. Demonstration of more appropriate sewage treatment systems such as sewage lagoons, oxidation detectors, and land spraying.

d. The use of solid waste as building materials.

e. The development of urban transport systems that put minimal demand on land energy and other resources.

Partly because the concerns of human settlements are so diverse, and encompass natural habitat, types of shelter, education, and health there has been the formation of a separate UN organization to deal specifically with human settlement. Most future UNEP activities in the area will be to underscore the environmental issues in human settlement problems, and to work in cooperation with the new UN Center for Human Settlements which is also in Nairobi.

In the past UNEP concerns in the health area have been largely tied to settlement issues which have included sewage disposal, clean water supplies, and pollutants such as toxic chemicals that endanger health. Many of the other subprograms in UNEP have health components. UNEP plans new emphasis in the Environmental Health and Environmental Health Management fields.

(May 1979)

NOTES

1. For example, the mere cataloguing of the nongovernmental organizations concerned with environmental issues is a process that is still going on.

2. See page 8 for UNEP's organization chart which illustrates other major parts of the agency not discussed in this review, particularly the Fund (finances) and Secretariat (administration) activities.

3. Although in Nairobi, Habitat is in separate offices, with its own staff and mandate.

4. The budget for the two-year period 1978-79 is some $33 million per year. The projected 1980-1983 budgets are expected to be the same in terms of percentages allocated to each program. It is important to note that $33 million is a very small budget compared to the budgets of other UN agencies, and to the tasks UNEP is expected to do. It is also important to note that each of the major budget areas has several subprograms.

5. This review of four selected activities in the Bureau of the Program does not discuss the full range of UNEP activities in other programs or in such areas as the Fund (financial base of UNEP), or the education, training, conference or liaison work. Appendix A briefly describes UNEP's other substantive programs in terms of the problems faced and the solutions attempted.

6. UNEP defines such activities to include shipping, seabed exploration and exploitation as well as river and land-based activities.

7. "U.N. Conference on Desertification," Department of State Bulletin, Washington, D.C., October 10, 1977, p. 457.

8. Other factors include the result of population growth and movement, greater use of marginal areas, and misguided national policies toward pastoralists.

9. Specifically these activities concern monitoring and assessing (a) pollutants in air, food, water and human tissues that may affect health (SO^2, heavy metals, and chlorinated hydrocarbons are the most important); (b) variables that may affect climate or may reflect and make possible the assessment of climatic changes (e.g., CO^2 and turbidity of the atmosphere, glacier masses, earth reflectivity); (c) the long-range atmospheric transport across European borders of pollutants such as Sulphur and Nitrogen oxides and their transformation products, which are responsible for the occurrence of "acid rain"; (d) renewable natural resources, particularly tropical forests, rangelands, and soils; and (e) ocean pollution, both in marine organisms and in ocean waters, a shared responsibility with the Regional Seas PAC.

10. In 1979 a number of activities on rangelands and desertification monitoring making extensive use of LANDSAT satellite imagery will be initiated in Africa, Asia, and South America. They will be closely linked to the development plans and rangeland and livestock management programs of the countries concerned and tailored to national needs so as to provide both informed guidance on how to implement the programs and a continued assessment of their effectiveness.

11. One example of the suspicious attitude occurred when a European country's environment office refused to give UNEP data on a specific river's pollution problem. It seems the river was near an atomic weapons factory, and the environment office thought any data about the river was highly classified. UNEP then asked the country's health ministry to provide the same information and received it immediately.

12. To develop the system further, Infoterra also keeps close ties with the Inter-Governmental Program for Cooperation in the Field of Scientific and Technological Information (UNISIST), a UNESCO agency. Other specialized "information source" agencies are in its network. Training services workshops have been held in Nairobi, Geneva, Dakar, Moscow, Sydney, and Bogotá to train consultants and staff in Infoterra.

13. Habitat, the Human Settlements agency, is now also headquartered in Nairobi.

14. In a larger sense this is also true for practically all UN agencies, and if seen in the prevailing political light of the UN serving as a channel for transfer of technologies, funds, and services from developed to developing countries, it is *the* existential question for the UN system.

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